OCD IN THE POSTNATAL PERIOD
AN INVESTIGATION OF THE IMPACT ON MOTHERS, PARENTING & INFANTS

Challacombe, Fiona

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Fiona L. Challacombe

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Abstract

Background: OCD is a relatively common and often disabling disorder that can have serious effects for the sufferer and those around them. Mothers may be more vulnerable to developing OCD after having a child, yet nothing is known about the adverse consequences on parenting and infants, and further if treatment ameliorates such effects. Patterns of help-seeking and treatment in this group are not well described.

Method: Study 1: Community mothers defined on a screener as low (n=33) or high (n=16) risk of developing OCD were assessed in detail antenatally and at six and twelve months postnatally using questionnaires, clinical interview and observed mother-infant interactions. The development of symptomatology was compared in the two groups.

Study 2: A group of 34 mothers with postnatally occurring OCD were recruited and assessed using the same methodology and compared with the low risk group in order to clearly delineate the effect on parenting of OC symptomatology.

Study 3: In a pilot randomized controlled trial to establish the effect of treatment on both symptoms and parenting, mothers with OCD received intensive CBT or treatment as usual following 6m assessment, with reassessment at 12m.

Results: (1) 3/16 high risk mothers and no low risk mothers had OCD at six months. However, 2/3 lost the diagnosis by twelve months. (2) Mothers with OCD were less sensitive in interactions (ES=0.8) and reported interference with parenting. (3) CBT was successful in ameliorating symptoms (ES=0.92-1.09). However, interactions were unchanged by treatment. The distribution of attachment categories was similar in both clinical groups and healthy controls.

Conclusions: An antenatal screening measure detected women who developed OCD at 6m. The diagnosis was not stable at 12m. OCD affects parenting and interactions. Although CBT was effective in this group, mother-infant interactions did not improve. However, attachment was unaffected.

300 words

Table of contents

Table of figures

Table of tables

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1. INTRODUCTION

It has long been known that postnatal mental illness can take many forms and that in addition to its intrinsically distressing impact for the woman it has the potential to influence parenting, child welfare and development and the mother-infant relationship. However, it has only been in recent years that significant research and clinical attention has turned to postnatal disorders other than depression and psychosis. Growing evidence points to the high prevalence of anxiety related problems, including GAD, mixed anxiety/depression and obsessive-compulsive disorder (OCD) during the postnatal period. As an appreciation of the range of psychopathology is broadened in this way, so the understanding of the mechanisms involved (both transdiagnostic and specific) also needs to be extended. In the present thesis, the focus is on OCD as a relatively distinct anxiety disorder, not least because becoming a parent is a frequently cited triggering or exacerbating factor in studies of clinical OCD. In addition, extensive research evidence illustrates that OCD can be debilitating to the sufferer and those around them, yet little is known about the impact of OCD on early parenting. Family studies show that the offspring of affected parents are at increased risk of psychopathology but biological studies have thrown little light on potential mechanisms. Therefore the issues surrounding OCD and early parenting are of particular importance as the disorder has the potential to influence the parent and the child in a number of direct and indirect ways.

Chapter 1 of this thesis will discuss the phenomenology and epidemiology of OCD and research evidence related to the development of OCD. It will consider the related issues of the barriers to help-seeking and identification of the illness, given that there is evidence that people suffering from OCD typically seek help late. Chapter 2 provides a detailed account of the current literature on perinatal OCD in terms of epidemiology and the impact on mothers. Chapter 3 considers the literature on early parenting and anxiety, and the influence of experiences of being parented on anxiety and subsequent parenting. Attachment will be discussed. Chapter 4 considers disorders of the perinatal period and the current understanding of OCD within this context. Issues relating to the presentation of perinatal OCD and the cognitive-behavioural treatment of OCD in pregnancy and the postpartum will be reviewed. The literature review will conclude with a summary of the research questions the current thesis aims to address and the hypotheses underlying the studies.

Chapter 5 of the thesis provides a detailed description of the methodology utilized in the prospective longitudinal study and pilot randomized controlled trial. Chapter 6 presents results of the studies, firstly the longitudinal study, then a cross-sectional comparison of parenting variables for mothers with and without OCD and then results of the treatment trial. Chapter 7 is a discussion of the results in the context of the existing literature and suggestions for further research.

It is generally acknowledged that pregnancy and childbirth are commonly experienced as stressful events. In order to understand what may be specific in terms of the prevalence and impact of OCD in the perinatal period, it is important to set the background context of rates and impact of OCD in the general population, and particularly in the female population. Given some of the issues affecting identification of perinatal OCD and help-seeking at this time, consideration of the variations in how OCD and obsessive-compulsive symptoms have been understood and diagnosed provides an important backdrop for the emerging data on OCD in the perinatal period which will be discussed in detail in chapter 2.

1.1 Phenomenology of OCD

Recognisable descriptions of what is now known as obsessive-compulsive disorder (OCD) have been recorded in a variety of source literature for many hundreds of years. Over time the conceptualisation of what characterises and underlies OCD (i.e. what OCD actually is) has gone through many changes, with theories ranging from it being a disorder of intellect, a disorder of the emotions, the result of cerebral pathology and the product of unconscious conflicts, to name a selection. The compulsions associated with OCD were often considered meaningless.

A significant paradigm shift in the understanding of OCD occurred alongside two significant revolutions in its treatment in the 1960s. Firstly the development of conditioning models of anxiety (including OCD) and their more specific application to OCD in the form of exposure and response prevention led to the formation of

behavioural (and subsequently cognitive-behavioural) models of OCD. These provided a framework for effective treatment. Secondly, the roughly contemporaneous finding that Clomipramine could help alleviate obsessional symptoms stimulated interest in the biological underpinnings of OCD, in particular the role of the neurotransmitter serotonin. These two strands of treatment stimulated attempts to elucidate some of the mechanisms involved in OCD and to better describe the disorder and target the underlying processes.

1.1.1 Diagnostic definitions of OCD

In general, attempts to tightly define and most importantly validate diagnostic definitions against the psychopathology and/or pathophysiology of psychiatric disorders have proven challenging, particularly regarding the thresholds between disorders and with non clinical symptoms and across disorders. This has led to difficulty in evaluating comorbidity between disorders and heterogeneity within them. As a result some have called for a new nosology to replace the system of 'shared phenomenological features' that underpins DSM with that of other shared characteristics such as biological markers or brain circuitry (cf. NIMH: Research domain criteria project). Others have suggested a simplified diagnostic system comprising mood regulation problems, distress disorders and fear disorders as the three primary categories. OCD was found to be hard to classify within this latter system which may imply that this approach is too reductionist (Watson 2005). The clinical utility of such alternatives to the existing systems have not been tested.

The sporadic shifts in the definition of Obsessive-compulsive Disorder (OCD) even in the last fifty years within and across diagnostic systems have meant that clarity around its phenomenology and epidemiology has been somewhat elusive. OCD was reclassified in a recent revision of the DSM, from being one of the group of anxiety disorders in DSM-IV (American Psychiatric Association, 2000) to being one of a 'spectrum of obsessive-compulsive and related disorders' (DSM-V, American Psychiatric Association, 2013). The disorders encompassed by this spectrum are thought to share the features of 'obsessiveness' and 'compulsiveness', and include problems such as body dysmorphic disorder, tic disorder, hoarding disorder and trichotillomania. The implications of this change for the diagnosis and treatment of OCD are not yet clear.

	Key phenomena
DSM-III	A Either obsessions or compulsions: **Obsessions**: recurrent, persistent ideas, thoughts, images or impulses that are ego-dystonic i.e. they are not experienced as voluntarily produced by rather as thoughts that invade consciousness and are experienced as senseless or repugnant. Attempts are made to ignore or suppress them **Compulsions:** repetitive and seemingly purposeful behaviours that are performed according to certain rules or in a stereotyped fashion. The behaviour is not an end in itself, but is designed to produce or prevent some future event or situation. However, either the activity is not connected in a realistic way with what it is designed to produce or prevent or may be clearly excessive. The act is performed with a sense of subjective compulsion coupled with a desire to resist the compulsion (at least initially). The individual generally recognizes the senselessness of the behaviour (this may not be true

	for young children) and does not derive pleasure from carrying out the activity, although it provides a release of tension. B. Significant distress or interference C. Not due to another mental disorder
DSM-IV-TR **(2000)**	A 1. recurrent and persistent thoughts, impulses, or images that are experienced, at some time during the disturbance, as intrusive and inappropriate and that cause marked anxiety or distress 2. the thoughts, impulses, or images are not simply excessive worries about real-life problems 3. the person attempts to ignore or suppress such thoughts, impulses, or images, or to neutralize them with some other thought or action 4. the person recognizes that the obsessional thoughts, impulses, or images are a product of his or her own mind (not imposed from without as in thought insertion) 5. repetitive behaviors (e.g., hand washing, ordering, checking) or mental acts (e.g., praying, counting, repeating words silently) that the person feels driven to perform in response to an obsession, or according to rules that must be applied rigidly 6. the behaviors or mental acts are aimed at preventing or reducing distress or preventing some dreaded event or situation; however, these behaviors or mental acts either are not connected in a realistic way with what they are designed to neutralize or prevent or are clearly excessive B. At some point during the course of the disorder, the person has recognized that the obsessions or compulsions are excessive or unreasonable. Note: This does not apply to children.Specifier: with poor insight C. The obsessions or compulsions cause marked distress, are time consuming (take more than 1 hour a day), or significantly interfere with the person's normal routine, occupational (or academic) functioning, or usual social activities or relationships.
DSM-V	As DSM-IV above but without criterion 2 (not excessive worries) and 4 (thoughts are a product of one's own mind). With good/fair, poor or absent insight
ICD-10	A. Either obsessions or compulsions or both, present on most days for a period

	of at least two weeks. B. Obsessions (thoughts, ideas or images) and compulsions (acts) share the following features, all of which must be present: ..originating in the mind of the patient ..repetitive and unpleasant, and at least one obsession or compulsion must be present that is acknowledged as excessive or unreasonable The subject tries to resist them (but if longstanding, resistance may be minimal) Carrying out the obsessive thought or compulsive act is not in itself pleasurable (this should be distinguished from the temporary relief of tension or anxiety). c. The obsessions cause distress or interfere with.. functioning.

Table 1 DSM-III, DSM-IV, DSM-V and ICD-10 criteria for OCD

Although its reclassification in DSM-V is a matter of debate (e.g. Storch, Abramowitz et al. 2008; Phillips, Stein et al. 2010), there remains consensus that anxiety is a fundamental characteristic of the experience of OCD. Under both of the latest DSM systems OCD is characterised by the presence of obsessions, defined as "recurrent and persistent thoughts, impulses, or images that are experienced, at some time during the disturbance, as intrusive and inappropriate ('unwanted' in DSM-V), and that cause marked anxiety or distress" and compulsions, which are "behaviors or mental acts ... aimed at preventing or reducing distress or preventing some dreaded event or situation". To warrant a diagnosis of OCD, the obsessions and/or compulsions must cause "marked distress, are time-consuming (take more than an hour a day), and/or significantly interfere with the person's normal routine, occupational functioning, or usual social activities or relationships. These symptoms must have been present for the past month."

The insight criterion has been refined in DSM-V with an explicit aim of assisting differential diagnosis. Previously adults were required to demonstrate some, even if 'poor' insight into the 'excessive or unreasonable nature' of the symptoms. Diagnosing clinicians using DSM-V are required make a rating of insight on a three point scale including 'absent insight'. This issue may previously have clouded DSM-IV diagnosis and those who were judged to have 'absent insight' were presumably more likely to be labeled with a psychotic or delusional disorder[1].

A significant proportion of people with (DSM-IV) OCD (9-30.7%) are classified as having 'poor insight' (Foa and Kozak 1995; Kishore, Samar et al. 2004; De Berardis, Campanella et al. 2008; Catapano, Perris et al. 2010; Jakubovski, Pittenger et al. 2011; Cherian, Narayanaswamy et al.). Lower ratings of insight have been generally been linked with greater OCD severity (Catapano, Perris et al. 2010; Jacob, Larson et al. 2013). Associations with particular symptom dimensions may be complex and related to mood amongst other variables (Alonso, Menchon et al. 2008; Fontenelle, Harrison et al. 2013). Insight is often reported as a fixed variable; however, intra-individual differences in insight are important as people with OCD may not be certain at all times that their behaviour is 'unreasonable or excessive', particularly when anxious (Foa and Kozak 1995) or depressed (Kishore, Samar et al. 2004; Alonso, Menchon et al. 2008; Fontenelle, Harrison et al. 2013). A more detailed understanding of how insight varies may be very pertinent to perinatal OCD to aid differentiation from other superficially similar perinatal disorders such as puerperal

[1] The APA guide to DSM-V highlights that "the presence of 'absent insight'/delusional beliefs warrants a diagnosis of the relevant obsessive-compulsive… disorder rather than a schizophrenia or psychotic spectrum disorder." (http://www.dsm5.org/Documents/changesfromdsm-iv-trtodsm-5.pdf)

psychosis and depression. This is particularly important as the onset of anxiety *or* psychosis can be rapid and acute in the immediate postpartum period.

The parallel diagnostic system to DSM, the World Health Organisation's ICD-10 (1992)(Organization. 1992), groups OCD with the 'neurotic, stress-related and somatoform disorders', a broader category than DSM-IV anxiety disorders which also includes adjustment and dissociative disorders. To warrant the ICD-10 diagnosis, 'unpleasurable' obsessions and or compulsions must have been present for at least a two-week period. In line with DSM-IV, the symptoms must be recurrent and have caused significant interference in the person's life. Although these differences imply that the ICD-10 diagnosis could potentially have a lower threshold than DSM, studies using ICD consistently identify a lower prevalence rate than those using DSM-IV (Fontenelle, Mendlowicz et al. 2006).

The difference in the two concurrent systems of DSM and ICD suggests that the clinical cutoff, most obviously the duration criteria, is somewhat arbitrary. Those with 'subclinical' levels of symptoms may represent an important group in terms of epidemiology and need (Gibbs 1996).

1.1.2 Symptom dimensions in OCD

Within the broader category of diagnosis, the form and content of obsessions and compulsions are many and varied and OCD is acknowledged to be a very heterogeneous disorder. This has led researchers to examine whether there are meaningful subtypes of the disorder, which may enable a better understanding of its causes and consequences. Factor analytic approaches using large surveys of

reported symptoms have led to the proposal of broad categories or subtypes of symptoms that may have different implications for causation and treatment. For example, Mataix-Cols and colleagues reviewed factor analytic studies of OCD dimensions and outlined four symptom dimensions (symmetry/ordering, hoarding, contamination/cleaning, and obsessions/checking) that they found to be associated with distinct patterns of comorbidity, genetic transmission, neural substrates, and treatment response (Mataix-Cols, do Rosario-Campos et al. 2005).. Although hoarding can considered as a part of OCD (Pertusa, Frost et al. 2010; Seaman, Oldfield et al. 2010) in general it has been found to differ on a number of phenomenological and outcome variables leading to its new status as a stand-alone disorder in DSM-V (Mataix-Cols, Frost et al. 2010).

Symptom type appears to be relatively stable within individuals, with any changes in primary presentation usually occurring within the same symptom dimension (Mataix-Cols, Rauch et al. 2002). Symptom type has also been linked to age of onset and gender (Kichuk, Torres et al. 2013; Torresan, Ramos-Cerqueira et al. 2013). This is discussed in more detail below.

Although, according to current diagnostic definitions, it is possible to be troubled by obsessions or compulsions alone (Torres, Prince et al. 2006), the vast majority of people with OCD experience both (Foa and Kozak 1995). It has also been suggested that, in OCD, there obsessions and compulsions always co-exist, but that assessors may fail to identify the "missing" aspect of OCD (for example in Rumination; see (Salkovskis and Westbrook 1989). In addition, for many individuals the co-occurrence of symptoms in a number of different categories is not uncommon and

categorisation into distinct groups may be difficult. 26% of participants in a recent study could not be readily classified into one of the subgroups described by Mataix-Cols et al. (Matsunaga, Hayashida et al. 2010). The disorder can therefore present with a wide variety of symptoms, even within the individual at a single timepoint. The research into symptom subtypes in perinatal OCD is discussed in chapter 2. The present author and collaborators take the view that there is a common phenomenology across OCD "subtypes" with the likely exception of some hoarders (Gordon, Salkovskis et al. 2013).

1.1.3 Obsessive-compulsive phenomena in the general population

A noteworthy factor in the epidemiological data on OCD is that experiences very similar in content and form to both 'obsessions' and 'compulsions' are experienced by a large proportion of the population (Rachman and de Silva 1978; Salkovskis and Harrison 1984; Muris, Merckelbach et al. 1997).

1.1.3.1 Intrusive thoughts

A number of studies have focused on the experience of unwanted intrusive thoughts (clinically known as obsessions) in the general population. A seminal study by Rachman and De Silva (1978) found that 79.9% of non-clinical participants reported obsessions, and that these were similar in content to obsessions reported by a parallel clinical sample. This finding was subsequently replicated by Salkovskis and Harrison (1984) who found that 88.2% of their nonclinical sample experienced obsessions and a rate of 99% was reported in a student sample by (Freeston, Ladouceur et al. 1991). Some subsequent studies have found the content of

abnormal and normal obsessions to be similar but distinguishable – on the basis of being categorised correctly at above chance levels by undergraduate and professional raters and by the finding that normal obsessions were endorsed more frequently than abnormal obsessions in an undergraduate sample (Rassin, Cougle et al. 2007; Rassin and Muris 2007). However, other studies have found the content to be indistinguishable (Belloch, Morillo et al. 2004; Garcia-Soriano, Belloch et al. 2011). Over time, both clinical and non-clinical obsessions have been found to be relatively stable in type within individuals (Mataix-Cols, Rauch et al. 2002; Fullana, Tortella-Feliu et al. 2007).

For people with and without OCD, 'intrusive' thoughts can be triggered by an external stimulus or seem to arise autogenously, with those in the latter category experienced as less acceptable (Parkinson and Rachman 1980; Lee, Lee et al. 2005; Belloch, Morillo et al. 2007). Importantly, in both clinical and nonclinical populations the content of intrusive thoughts tends to be relevant to the person's current concerns (Rachman 1997; Lee and Kwon 2003; Rowa, Purdon et al. 2005). People with OCD do not experience more intrusive thoughts in all situations compared with controls, but do experience more when exposed to idiosyncratically stressful situations (Wroe, Salkovskis et al. 2000).

The differences between clinical and non-clinical symptoms have been found to lie primarily in the frequency, duration and intensity with which they are experienced. Clinical participants experience intrusive thoughts as less acceptable, less resistible and less able to be dismissed (Rachman and de Silva 1978; Salkovskis and Harrison 1984; (Purdon and Clark 1994). It is important to note that intrusive thoughts in

non-clinical populations are often experienced with some degree of distress (Purdon and Clark 1993), if not interference (Abramowitz, Schwartz et al. 2003). At the same time, those with subclinical symptoms find their thoughts and obsessions distressing and interfering, but fall short of the clinical threshold (Ruscio, Stein et al. 2010), suggesting a spectrum of response to intrusive thoughts.

1.1.3.2 Appraisals of and responses to symptoms

Given that the range of content of obsessions is similar or even identical between clinical and non clinical groups, individual responses to obsessional thoughts have been hypothesized as being key in explaining the differences. Responses include the appraisal of the content and occurrence of the thought, emotional reactions, and strategies used as a result of the appraisal or reaction.

Thoughts experienced as more ego-dystonic were associated with more distress in both clinical and non-clinical samples (Rowa and Purdon 2003; Rowa, Purdon et al. 2005). Purdon and Clark (1994) found that non-clinical participants who engaged in thought control strategies following an intrusive thought experienced more distress. Similarly (Freeston, Ladouceur et al. 1991) found that effortful styles of response to thoughts such as escape/avoidance and attentive responses were related to higher levels of sadness worry and guilt in a non-clinical sample. Comparable thought control strategies are used by people with OCD and non clinical participants, with a greater use of punishment and less use of distraction in those with OCD (Abramowitz, Whiteside et al. 2003) and greater use of strategies related to thought content (Ladouceur, Freeston et al. 2000).

In Muris et al's (1997) study on normal and abnormal compulsions, 54.7% of participants reported engaging in compulsions. Similar to findings on obsessions, Muris found clinical compulsions to be more frequent and intense, eliciting more discomfort and resistance to the associated thought.

1.1.3.3 Differences between worries and intrusive thoughts

Within non-clinical individuals, obsessions have been shown to differ significantly from everyday worries in terms of being less frequent, more ego-dystonic and more imagery based (Langlois, Freeston et al. 2000; Lee, Lee et al. 2005). People with OCD clearly can and do experience worries alongside their obsessions, and those with greater responsibility beliefs may be more prone to pathological worry in addition to OCD (Abramowitz and Foa 1998).

The finding that intrusive thoughts are common in the general population and that they are associated with a range of levels of distress and interference has important implications for epidemiological studies of OCD. The issue of the presence of 'normal' obsessions and compulsions and how to distinguish them from OCD or in particular subclinical OCD is rarely explicit in these studies. The issue is important as the presence of interfering subclinical symptoms may imply later risk for OCD in some individuals (Fullana, Mataix-Cols et al. 2009). A further issue in the diagnosis of OCD is the presence of 'intrusive thoughts' across disorders such as depression, panic and PTSD (Fullana, Mataix-Cols et al. 2009). In one of the few studies to compare responses to intrusive thoughts in depression as well as OCD and other anxiety disorders, (Morillo, Belloch et al. 2007) found that worrying that the thought will come true and the importance of controlling the thought distinguished

OCD from depression and other anxiety disorders, with some overlap with depression on other aspects such as guilt for having the thought and unacceptability of the thought. Further studies providing more detailed descriptions of the phenomenology of the thoughts in terms of ego-dystonicity and response to thoughts would help distinguish obsessional and non-obsessional symptoms. Given the high prevalence of depression in the postnatal period, there is a risk that this diagnosis can overshadow others due to the superficial similarity of some aspects such as the presence of intrusive thoughts. This is discussed in more detail in chapters 2 and 4.

1.1.4 Cognitive models of OCD

Currently, the phenomenology of OCD is particularly well accounted for by Cognitive-behavioural models. The meaning attributed to events is the cornerstone of cognitive theories of psychopathology (Beck 1976); the finding that underlies cognitive models of OCD is that the idiosyncratic meaning of and reactions to mental events (rather than their occurrence per se) distinguishes clinical from non clinical obsessions. Cognitive-behavioural models propose that normal obsessions become problematic when either their occurrence or content are interpreted as personally meaningful and threatening (Rachman 1997; Salkovskis 1997), and it is this *interpretation* which mediates the distress caused (Purdon 2001; Barrera and Norton 2011). According to cognitive models, the interpretation of the thought results in a number of voluntary and involuntary reactions which each in their turn can have an impact on the strength of belief in the original interpretation. Negative appraisals can therefore act as both causal and maintenance agents in OCD.

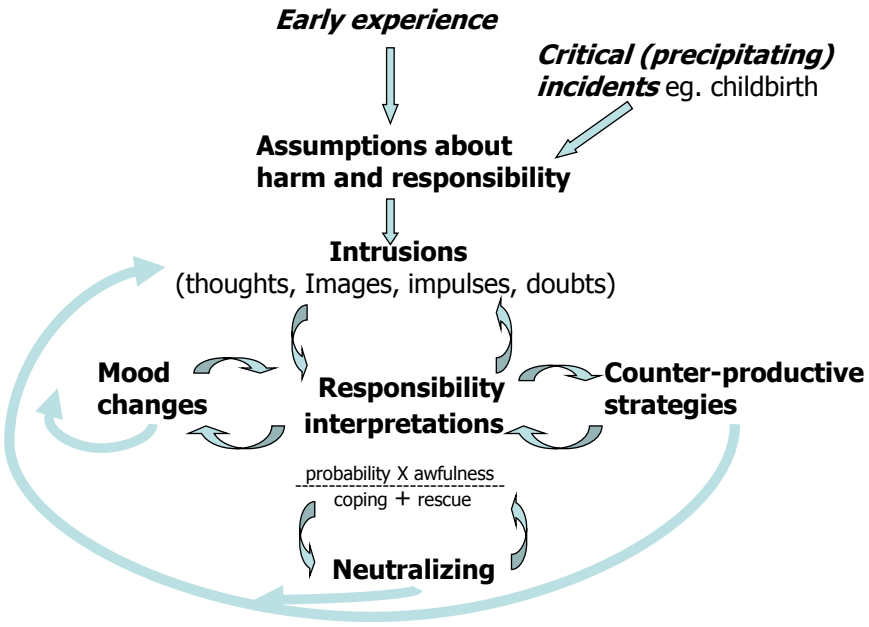


Figure 1: Cognitive model of OCD described by Salkovskis (1985).

This model has been supported by studies which show that obsessions are likely to be troubling when the content goes against personally held values or a sense of self (Rowa, Purdon, Summerfeldt, & Antony, 2005). Clinical and analogue research has also shown that compulsive behaviours such as checking, thought suppression and avoidance serve to increase a sense of danger or doubt and increase the frequency of obsessional thoughts (Freeston, Ladouceur et al. 1991; Marcks and Woods 2007; Markowitz and Purdon 2008; Giele, van den Hout et al. 2012). The failure of strategies such as thought suppression can be interpreted as significant, leading to increased preoccupation with the intrusive thought (Tolin, Abramowitz et al. 2002).

Theoretically, the occurrence or content of the obsessional intrusion activates or interacts with background beliefs, such as responsibility appraisals (Salkovskis, Wroe et al. 2000) to make the problematic interpretation more likely. Experimental

manipulations of responsibility have also been shown to increase obsessional-like behaviours on some tasks e.g. making the participant responsible for turning off a stove (Ladouceur, Rheaume et al. 1995; Arntz, Voncken et al. 2007).

The phenomenology of OCD has been hard to pin down to rigid definitions, particularly given the range of possible symptoms and the presence of obsessions and compulsions in the general population. The cognitive model is useful as it incorporates idiosyncratic information and can thus accommodate much of the heterogeneity seen in OCD in terms of symptom subtype, conditions of onset and subsyndromal symptoms. The cognitive model has good explanatory power for normal, subclinical and clinical symptoms of OCD. It is well supported in terms of psychological and behavioural factors that maintain the problem; research attention is increasingly turning to factors that contribute to the development of OCD.

1.2 Epidemiology of OCD

1.2.1 Prevalence of OCD

Given the difficulties described in clearly defining and delineating clinical OCD, it is not surprising that studies examining the prevalence of OCD have produced some inconsistencies in results. This is also likely to be due to the use of a range of instruments, methodologies and criteria for diagnosing OCD as well as variations in rater skill, sampling and population (Fontenelle, Mendlowicz et al. 2006).

Once estimated to be a very rare disorder (Woodruff and Pitts 1964), this notion was revised with the undertaking of large-scale epidemiological studies. The US

Epidemiological Catchment Area study sampled five US communities utilising the Diagnostic Interview Schedule (DIS) to establish DSM-III diagnosis. This study estimated average lifetime prevalence for OCD at 2.5% (range 1-3%) and point prevalence of 1.2% (Karno, Golding et al. 1988).

Subsequently the Cross National Collaborative Group examined prevalence rates in six countries: Canada, Germany, Korea, New Zealand, Puerto Rico and Taiwan. With the exception of Taiwan where the prevalence was 0.4%, consistent international results supported the figure of 3% derived from the ECA study (Weissman, Bland et al. 1994). However, these studies may have overestimated prevalence due to the use of lay raters using the DIS who may have been over-inclusive in their definition of obsessions and compulsions; the reliability of the DIS was called into question in follow- up study that obtained a kappa of 0.2 (Nelson and Rice 1997).

The development of DSM-IV refined the definition of obsessions and specifically excluded other Axis 1 disorders that could confound the OCD diagnosis. Using DSM-IV criteria and the CIDI as the diagnostic instrument in a nationally representative Australian sample of 8310 individuals (Crino, Slade et al. 2005) found a weighted one month prevalence of 0.5% and 12 month prevalence of 0.6%. This study was able to compare DSM-III and DSM-IV diagnosis in the same individuals and found a markedly lower weighted 12m prevalence than that established with DSM-III which had been 2.1%.

Two relatively recent large scale studies in the UK and USA stand out as being robust in methodology and representative, the UK Psychiatric Morbidity Study and the National Comorbidity Survey. The UK study utilized the Clinical Interview

Schedule revised; (CIS-R) to diagnose OCD in a sample of 8580 individuals. This instrument was designed for the use of lay raters and focuses on the past week to yield an ICD-10 diagnosis. This study identified a 1-month prevalence of OCD of 1.1% (Torres, Prince et al. 2006).

The figure derived by Torres et al is very similar to the 1.2% 12 month prevalence rate described in the US National Comorbidity Survey-replication (NCS-R) (Ruscio, Stein et al. 2010). The NCS-R used ICD diagnosis and validated the diagnosis with DSM-IV in a sub sample of 2073 individuals. The NCS-R study also assessed sub-clinical symptoms, severity and impairment as well as the nature of the symptoms using the categories of Mataix-Cols, do Rosario-Campos et al. (2005). Ruscio et. al identified a lifetime prevalence of 2.3%, with 28.3% of respondents reporting a subclinical history of obsessions and/or compulsions. Most commonly the sub-syndromal respondents reported checking (15.4%), hoarding (14.4%) or ordering symptoms (9.1%). The presence of obsessions regarding harm or sexual/religious obsessions was more likely to be associated with a diagnosis of OCD; a third of obsessions were not defined in any particular category by respondents (Ruscio, Stein et al. 2010).

A 30 year follow up study in Germany which also included subsyndromal symptoms, (Angst, Gamma et al. 2004) found a lifetime prevalence of 3.5% for OCD and of 8.7% for more broadly defined obsessive-compulsive symptoms. In a large representative New Zealand population based cohort of 1037, (Fullana, Mataix-Cols et al. 2009) found a DSM-IV point prevalence rate for OCD of 2.3% at 26 years which dropped to 1.8% at 32 years. Sub-syndromal symptoms affected approximately 25%

of participants at both timepoints. A large Singapore based study found a lifetime prevalence of 3% and 12 month prevalence of 1.2 % (Subramaniam, Abdin et al. 2012). It has been suggested that cross-national 12 month prevalence rates are relatively consistent at 1.1-1.8 (Horwath and Weissman 2000).

However, in contrast with the other studies reported above, a recent Nigerian study found the lifetime and point prevalence of OCD to be 0.1% (Gureje, Lasebikan et al. 2006). Similarly, a large representative German sample of 4075 people using the CIDI, (Grabe, Meyer et al. 2000) found a lifetime prevalence of 0.5% for full OCD, and of subclinical OCD of 2%. The twelve month prevalence rates were 0.039% and 1.6% respectively. By contrast at the other end of the variance, the 12 month prevalence of OCD in a Turkish study was 3% (Cilli, Telcioglu et al. 2004).

Few studies have examined incidence. (Nestadt, Bienvenu et al. 1998) re-interviewed 1920 people from the original ECA cohort of 3481 12-14 years after the original interview. They reported an incidence of 0.55 cases per 1000 person years. A large Dutch study using the CIDI found an incidence of 0.2 (de Graaf, Bijl et al. 2002).

Overall then, lifetime prevalence for DSM-IV OCD has been estimated at between 0.5% and 3.5%, and 12 month prevalence of between 0.039% and 3%. Based on the above studies, the median 12 month and lifetime prevalences are 1.1% and 2.3% respectively.

1.2.2 Comorbidity in OCD

Comorbidity is high in OCD, with 62-90% of people with OCD also suffering from another DSM-IV Axis I disorder (Fireman, Koran et al. 2001; Crino, Slade et al. 2005; Torres, Prince et al. 2006; Ruscio, Stein et al. 2010). Rates of comorbidity with depression range from 37-63%, and other anxiety disorders including GAD from 20-75.8% (Abramowitz and Foa 1998; Crino, Slade et al. 2005; Torres, Prince et al. 2006; Ruscio, Stein et al. 2010).

In a sample of people with OCD, Ricciardi and McNally (1995) found that comorbid depression was linked to higher rates of obsessions but not compulsions. This study noted that in 85% of their sample, OCD preceded (65%) or began at the same time (20%) as the mood disorder. However, in the NCS-R study Ruscio, Stein et al. (2010) found that mood disorders were almost as likely to precede (40.2%) as to follow OCD (45.6%). These authors found that bipolar disorder was associated with a greater likelihood of developing OCD; lifetime bipolar disorder was also associated with lifetime OCD in the recent 30 year follow up study of (Fineberg, Hengartner et al. 2013).

Besiroglu, Uguz et al. (2007) specifically examined people with major depressive disorder that had developed after OCD and compared them with those who had not developed depression. The comorbid group was more severe in OCD pathology, was more likely to have GAD and experienced a higher rate of aggressive obsessions.

In the NCS-R study, Ruscio, Stein et al. (2010) found that OCD typically emerged from the context of comorbid anxiety disorders, with these beginning first in 79.9%

of cases. The exceptions were separation anxiety disorder which followed OCD in 53.2% of cases and PTSD which was as likely to precede (39.9%) as follow OCD (39.4%), and emerged in the same year for 20% of cases.

The UK Psychiatric Morbidity Study Torres, Prince et al. (2006) found alcohol dependence to be more common in those with OCD (20.2%) than controls (6.3%). Similar results were found for drug dependence (13.5% v 2.9%). The figures for a group of people with other neurotic disorders fell between the OCD and control groups but did not differ significantly from either. Ruscio, Stein et al. (2010) found comorbidity with substance use disorders of 38.6% and report an odds ratio of 3.2-6. Other studies have not found increased rates of substance abuse disorders in people with OCD (Nestadt, Samuels et al. 2001; Fineberg, Hengartner et al. 2013).Gentil, de Mathis et al. (2009) found that 7.5% of their treatment seeking sample had comorbid alcohol use disorder and that this was associated with male gender, suicidal thoughts and hoarding symptoms as well as other comorbidity, potentially representing a high risk subgroup.

Some researchers have made a case for subtyping on the basis of comorbidity, including an OCD plus depression group, OCD plus tic disorders and OCD plus affective disorders and personality disorders (Nestadt, Di et al. 2009). Evidence for such an approach is however sparse.

Torres et al (2006) found that only 14% of those with OCD without comorbidity sought help v 56% who had comorbid conditions. *Comorbidity is therefore important as it may be a marker of severity driving people to treatment. An alternative is that people may be more likely to seek help for more well known or*

visible disorders such as depression in the postnatal period even if OCD is a problem of equal significance.

1.2.3 Age and gender in the epidemiology of OCD

OCD is slightly more prevalent overall in women than men (1.44:1; Torres, Prince et al. 2006). In the ECA study women were one and a half times more likely than men to meet criteria for OCD in their lifetime (3.1% v 2%; Karno, Golding et al. 1988). (Angst, Gamma et al. 2004) found lifetime prevalence rates of 1.7% for men to 5.4% for women. A recent systematic review found consistently higher rates for women in 22/27 studies reviewed (Fontenelle, Mendlowicz et al. 2006). However, these ratios appear to be age dependent.

The NCS-R study found that males accounted for the majority of cases occurring before the age of 10 (Ruscio, Stein et al. 2010). Later peaks of incidence were also found in females in the ECA study (Nestadt, Bienvenu et al. 1998). Incidence of DSM-III OCD after the age of 18 was investigated by (de Graaf, Bijl et al. 2002) in a Dutch sample who reported rates of onset in women to men of 1.28% v 0% from 18 to 24, and 0.73% v 0.21% from 25-34. For women, incidence rates in all age categories after 35 were below 0.0001%. By contrast men had a rate of 0.34% at 35-44, 0% at 45-54 and 0.37% at 55-64. These figures are similar to those found by Crino, Slade et al. (2005).

Early onset has been strongly associated with male gender, greater symptom severity and higher familial association, and a higher comorbidity with tics (Millet, Kochman et al. 2004; Torres, Prince et al. 2006; Taylor 2011). Studies have

consistently found sexual obsessions to be associated with earlier onset and male gender, while female gender is more likely to be associated with contamination/cleaning and aggressive obsessions (Labad, Mencho et al. 2008; de Mathis, de Alvarenga et al. 2011; Narayanaswamy, Viswanath et al. 2012; Kichuk, Torres et al. 2013; Torresan, Ramos-Cerqueira et al. 2013).

There may be different patterns of comorbidity in men and women, with men more likely to have comorbid tic disorders and substance use while women are more likely to have comorbid phobias and eating disorders (Grabe, Meyer et al. 2001; Torres, Prince et al. 2006). Comorbidity in both genders was found between the presence of aggressive obsessions and PTSD, and sexual/religious obsessions and major depression (Torres, Prince et al. 2006).

An interview study by (Bogetto, Venturello et al. 1999) found that females generally experienced later onset and a more episodic course of OCD than males. Women were noted to have a higher frequency of aggressive obsessions at the onset of disorder than men. OCD in women has been associated with being married and having children whist in men the opposite is true (Lensi, Cassano et al. 1996).

Although cross cultural comparisons have been made showing OCD to have a consistent prevalence across cultures (Weissman, Bland et al. 1994), OCD appears to be less common in minority groups within a particular culture, although this may be a matter of stigma in reporting symptoms (Karno, Golding et al. 1988).

In summary, overall, the evidence does suggest that OCD is somewhat more common in women than men. Women are more likely to have a later age of onset

than men, and patterns of presentation are slightly different with a preponderance of aggressive and contamination obsessions in females. For women the onset or significant interference of OCD often coincides with the childbearing years. Comorbidity has typically been taken as potentially indicating fundamental differences in the phenotype of OCD. However, the more parsimonious explanation is that severe OCD may serve as a psychological vulnerability factor or trigger for other problems, particularly anxiety and mood disorders. In addition, there is some criterion contamination between OCD and other disorders, particularly depression and generalized anxiety.

1.2.4 Course of OCD

Anxiety disorders often relapse in the short and long term (Hendriks, Spijker et al. 2013; Scholten, Batelaan et al. 2013) and about a third of those recurring develop a different anxiety disorder (Scholten, Batelaan et al. 2013). Follow back studies show that OCD is preceded by a history of juvenile anxiety disorders (by age 15) in 54% of cases, a rate similar to other anxiety disorders (Gregory, Caspi et al. 2007)

It has been suggested that OCD or obsessive compulsive symptomatology begins or takes hold for the majority of people in childhood or adolescence, with the full blown disorder most likely to appear before the individual is 30 (Angst, Gamma et al. 2004; Fullana, Mataix-Cols et al. 2009; Fineberg, Hengartner et al. 2013). However, this suggestion does is inconsistent with the average age of onset noted in adult OCD, which suggests the majority of adult cases have their onset during or after late adolescence.

Once symptoms of OCD have appeared, for a given individual they may also fluctuate in nature or severity, depending on other concurrent factors in the person's life (Besiroglu, Uguz et al. 2007). Many people may experience subsyndromal symptoms that interact with particular events at particular times to tip people into or away from the disorder (Coles, Johnson et al. 2011; Coles, Hart et al. 2012). The course of OCD can be episodic or more chronic (Perugi, Akiskal et al. 1998). Differences in course may be related to symptom presentation, for example, unwanted obsessions have been associated with a more waxing and waning course than symmetry/ordering symptoms which are more chronic (Kichuk, Torres et al. 2013). One study has found that magical obsessions and rituals were more persistent than other forms of the disorder in long term follow up (Skoog and Skoog 1999) although evidence is inconsistent (Bloch, Green et al. 2013).

It has been suggested that, particularly in comparison with other disorders, the diagnosis of OCD is not stable in childhood (Black, Gaffney et al. 2003; Carballo, Baca-Garcia et al. 2010). However, earlier onset may be linked to a more persistent disorder (Skoog and Skoog 1999; Fullana, Mataix-Cols et al. 2009; Micali, Heyman et al. 2010). Both psychological and pharmaceutical treatment studies in adulthood have found that whilst those with earlier onset may have more severe symptoms at baseline, treatment outcomes are equivalent to those with later onset (Fontenelle, Mendlowicz et al. 2003; Lomax, Oldfield et al. 2009) although others have reported a worse outcome for pharmaceutical intervention for early onset cases, in particular those with a family history of OCD (Erzegovesi, Cavallini et al. 2001).

A handful of studies have been conducted to shed light on the course and long-term outcome of adults with OCD, including the spontaneous or self-directed resolution of individual episodes. Studies have tended to focus on treatment- seeking samples and examine the predictors of outcome following intervention.

The timeframe for follow up in particular studies can suggest different figures relating to the course of the illness. In two studies on the same sample of 213 treatment seeking individuals, Eisen, Pinto et al. (2010) found that over a two year period, 48 (22.4%) of the sample remitted. The probability of full remission was only 6% and of partial remission was 24% although periods of subclinical OCD were common for individuals over the timeframe. Only one (2%) of the 48 people who had remitted relapsed in two years. Further improvements were seen in the second study reporting outcome at five years. This found that overall 39% of the sample remitted, 22.1% remitted partially and 16.9% experienced full remission. However, 59% of these had relapsed at some point over the time frame. The presence of obsessive-compulsive personality disorder was associated with a twofold increase in the probability of relapse, and those in partial remission were also more likely to relapse than those in full remission (70% v 45%) (Eisen, Sibrava et al. 2013).

In a longer term follow up study, Bloch, Green et al. (2013) found that 49% of 83 people who had taken part in an SSRI trial, were still symptomatic 10-20 years after treatment. Initial treatment response predicted outcome, and no association was found with any particular symptom dimension. A recent naturalistic 30 year follow up study of a sample of 591 Swiss participants selected from a larger community sample on the basis of high risk of developing a disorder, found remission to have

occurred in two thirds of participants (69%) who developed OCD (representing 5.7% of the total) over the 30 year period (Fineberg, Hengartner et al. 2013). Similarly, a Swedish forty-seven year follow up study of 144 people hospitalized for OCD in the 1950s found that improvement occurred in 83% of participants, with 20% experiencing full recovery (defined as being asymptomatic for at least the last five years). However, 48% of participants experienced persistent OCD for the full follow up period (Skoog and Skoog 1999). The long term nature of the study puts the generalisability of the results in question: retrospective review indicated that only 85% of the full sample would have met DSM-IV criteria but all participants were included in the analysis (although checks were undertaken that this did not influence the outcome of statistical testing). Most patients were not reported to have received any interventions and a minority was subject to psychosurgical interventions including lobotomy.

Even for those treated continuously with SSRIs over a three year period, the probability of achieving at least partial remission at some point was 65%; the probability of relapse was 60% (Catapano, Perris et al. 2006). In one study examining relapse rates in those who had taken medication alone (SRI) for a period of two years and then discontinued it, relapse rates were worse in those who had achieved full remission (33%) rather than partial remission (9.8%) (Grant, Mancebo et al. 2013).

Overall, the evidence relating to the course of the illness is based on studies of treatment-seeking samples and should be interpreted with caution given the wide disparities in treatment uptake, availability and effectiveness between studies and

populations. This is particularly true of longer term follow up studies in which there has been considerable change in the development of services and treatments since the beginning of the follow up periods.

The diagnostic definition of OCD has not been stable over time, and the inclusion of subclinical categories and obsessive-compulsive symptoms makes understanding the epidemiology of OCD even more difficult. Therefore the context is blurred for understanding the rate of OCD in selected populations such as perinatal.

1.3 Impact and burden in OCD

In the NCS-R study OCD was found to be the most severe anxiety disorder, with 50.6% of cases in a 12m period classified as 'serious' (compared with 22.8% of anxiety disorders as a whole) (Kessler, Chiu et al. 2005). Studies examining the impact on individuals have frequently found a severe impact on quality of life in individuals with OCD (Bobes, González et al. 2001; Albert, Maina et al. 2010; Subramaniam, Abdin et al. 2012) although a meta-analysis of the impact on quality of life from anxiety disorders found high levels of impairment across all disorders particularly in mental health and social functioning (Olatunji, Cisler et al. 2007).

Unsurprisingly, greater symptom severity has been associated with poorer quality of life in OCD (Eisen, Mancebo et al. 2006; Fontenelle, Fontenelle et al. 2010; Rosa, Diniz et al. 2012). Eisen, Mancebo et al. (2006) suggest that a YBOCS score of at least 20 was associated with significant decline in quality of life compared with those with lower scores still over the clinical threshold (a YBOCS score of 8 or

above). A longer duration of the illness has also been related to a greater impact on quality of life (Dell'Osso, Benatti et al. 2013).

Studies have found that self-rated impairments in the some domains of quality of life (psychological wellbeing and social relationships) were worse than in a group of people with schizophrenia and depression (Bobes, González et al. 2001; Stengler-Wenzke, Kroll et al. 2006).

One marker of the severity of the illness is the finding that 25.7% of those with OCD in the British comorbidity survey had attempted suicide while 63.3% had experienced suicidal thoughts (Torres, Prince et al. 2006). Similarly, (Torres, Ramos-Cerqueira et al. 2011) reported that 36% of their sample had experienced lifetime suicidal thoughts, 20% had made plans and 10% had made attempts. However, this level of suicidality has not been found in all studies (Alonso, Segalas et al. 2010).

Huppert et al examined quality of life in those with OCD with and without comorbidity, those in remission from OCD and an age and sex- matched control group. This study found that quality of life and functioning in terms of work, social and family life was affected by the presence of OCD, and that comorbidity, in particular depression was associated with worse functioning (although the direction of causality is at best unclear(Huppert, Simpson et al. 2009). Similarly , Storch et al (2009) found that functional impairment was associated with depression and beliefs about thoughts (Storch, Abramowitz et al. 2009). Several other studies have found that comorbid depression is strongly associated with poorer quality of life (Moritz, Rufer et al. 2005; Stengler-Wenzke, Kroll et al. 2007; Fontenelle, Fontenelle et al. 2010). A range of aspects of quality of life can be affected by OCD including physical

health (Moritz, Rufer et al. 2005; Subramaniam, Abdin et al. 2012) and the ability to work (Leon, Portera et al. 1995).

Although all clinical anxiety disorders adversely affect quality of life (Olatunji, Cisler et al. 2007) OCD may have a greater impact on family life than other anxiety disorders (Lochner, Mogotsi et al. 2003; Torres, Prince et al. 2006). What is not clear is the likely impact of effective treatment of OCD on the subsequent development of apparently comorbid problems.

1.3.1 Differential effect of symptom type on QoL

Although one study found an impact on quality of life from compulsions but no impact on quality of life from obsessions (Stengler-Wenzke, Kroll et al. 2007), several others have found an impact from a range of symptoms. Obsessions, washing and hoarding appear to have a more negative impact on quality of life than other symptom dimensions. (Gezginc, Uguz et al. 2008; Fontenelle, Fontenelle et al. 2010; Rosa, Diniz et al. 2012). Evidence from studies examining the impact on family life indicates that some symptom dimensions may be more troublesome than others (see below).

1.3.2 Symptom remission and improvements in QoL

Unfortunately the impairments in quality of life can outlast symptom reduction in OCD (Srivastava, Bhatia et al. 2011). Although treatment improved quality of life, those in remission did not differ significantly from the comparison groups, with

scores falling between those of people with current OCD and healthy controls (Huppert, Simpson et al. 2009).

OCD is known to curtail the life trajectory of individuals and prevent them trying to achieve their goals, sometimes due to direct interference from the disorder but also due to the impact of beliefs associated with the disorder such as lack of self-efficacy. These beliefs and general sequelae may persist beyond treatment; simply speaking, the damage caused by a prolonged period of OCD may not be fully reversible e.g. employment, education, relationships. Further, even the experience of having been a sufferer can have an ongoing influence on self-perception and fears of relapse can persist. The symptoms may cause irreparable damage that continues to reverberate, such as the impact from divorce or separation (Goodwin, Koenen et al. 2002; Subramaniam, Abdin et al. 2012) or consequences of the decision not to have children because of OCD when biologically able (Neziroglu, Anemone et al. 1992).

1.3.3 Impact on family members

OCD affects not only the sufferer but those around them and given the pervasive nature of the problem across situations, the impact on family members can also be great (Black, Gaffney et al. 1998; Laidlaw, Falloon et al. 1999; Angermeyer, Kilian et al. 2006; Stengler-Wenzke, Kroll et al. 2006; Albert, Salvi et al. 2007; Grover and Dutt 2011; Cicek, Cicek et al. 2013). The impact on family members can be indirect (for example psychological problems as a result of worrying about their loved one)

or direct by involvement in the symptoms (for example by giving reassurance or following obsessional rules).

Magliano, Tosini et al. (1996) found moderate to severe levels of burden in family members, which were similar to relatives of people with severe depression. Both groups endorsed feeling they had 'given up on living life as they wanted' (58% OCD versus 57% MDD), having 'health problems as a result of the situation' (59% OCD versus 57% MDD) and 'being at the relative's beck and call' (62% OCD versus 46% MDD). Both groups perceived a significant burden on social relationships, with 74% (versus 61%) feeling that social relationships were compromised, 59% (versus 48%) saying this was entirely due to their relatives problem. Relatives of people with OCD differed from those related to people with depression in their own feelings of depression (84% recording such feelings against 61% in the depression group) and nervous tension (75% versus 50%). Taking a clinical threshold, higher rates of major depressive disorder, but not other disorders were also found in family members of people with OCD compared with controls (Cicek, Cicek et al. 2013).

There is clearly a range of possible responses to the demands of a relative's obsessional illness. Due to the nature of the symptoms, the sufferer can demand that family members change their behaviour as a result of their own fears, to mimic the compulsions and safety behaviours that they are themselves engrossed in. Family accommodation (the term given to the concept of adapting behaviour to the sufferers symptoms), is commonplace in family members and the degree to which it takes place has been linked to poor family functioning (Calvocoressi, Lewis et al. 1995; Albert, Salvi et al. 2007). One study found 96.9% of families accommodated

symptoms, with 59% saying it was a daily occurrence (Stewart, Beresin et al. 2008). Similarly, (Albert, Bogetto et al. 2010) found accommodation to be common, with the provision of reassurance, participation in rituals and assisting the patient in avoidance being the most frequent practices (occurring on a daily basis in 47%, 35%, and 43% of family members, respectively). Contamination/cleaning was the symptom dimension most associated with family accommodation in both of these studies.

Accommodation of symptoms by family members has been found to predict poorer treatment response (Ferrao, Shavitt et al. 2006; Boeding, Paprocki et al. 2013), as has accommodation by parents of OCD afflicted children (Waters and Barrett 2000). In one published study the spouse of an affected partner developed parallel symptomatology which resolved spontaneously upon improvement of his symptoms, suggesting a 'contagion' of psychopathology (Mergui, Jaworowski et al. 2010). Given the experimental data showing that engaging in compulsive-like behaviour increases obsessive-like symptoms such as doubt e.g. (Marcks and Woods 2007), accommodating involving mimicking symptoms is a plausible mechanism to passing on the disorder. Although unstudied, this may be particularly influential on children (see modeling section below).

Families are clearly affected by OCD. Improvements in family members quality of life with treatment for the individual has not been examined, although interventions directly targeting accommodation show promising results in terms of benefits to the relationship and individual outcome for the sufferer (Abramowitz, Baucom et al. 2013).

The concept of family accommodation has not been studied with regard to the children of parents with OCD, or in relation to perinatal OCD.

1.3.4 Help-seeking in OCD

Epidemiological and family burden studies are conducted with those who have a diagnosis of OCD; it seems likely that the situation may be better for those who have successfully sought help (although not necessarily so). Given the documented impact of OCD, it is hoped that treatment has an impact not only on OCD but on quality of life for all those affected. A prerequisite of treatment is help-seeking.

Once a person identifies themselves as having a problem such as OCD, there are three aspects of help seeking: approaching a health professional, treatment being initiated, and the given treatment being evidence-based, of adequate quality and adequately adhered to.

Some studies have found that, in comparison with other disorders, those with OCD may make more use of mental health services (Karno, Golding et al. 1988; Torres, Prince et al. 2007). Other studies report that the prevalence of OCD in treatment seeking populations such as GP practice lists is low (0.084-0.5%) in comparison to community studies, suggesting very low rates of treatment utilization compared with the likely population prevalence (Fireman, Koran et al. 2001; Gyani, Shafran et al. 2012; Veldhuis, Dieleman et al. 2012).

One reason for the discrepancy may be the fluctuating nature of symptoms: when taking subthreshold disorders into account, a greater number of people were found

to be in contact with services (e.g. 5.8% vs 1.4% of those with OCD only in (Olfson, Broadhead et al. 1996).

Studies directly enquiring about help-seeking in people with OCD also suggest that rates are low. Only 28% of respondents in one UK study had ever sought help (Pollard, Henderson et al. 1989) compared with 36.6% in a Canadian study (Mayerovitch, du Fort et al. 2003) and 10.2% in a Singapore study (Subramaniam, Abdin et al. 2012). The NCS-R study (Ruscio, Stein et al. 2010) found that 29.2% of the US sample had received any treatment for OCD in their lifetime. People with severe symptoms (30.9%) were more likely to have received treatment than people with moderate symptoms (2.9%) in the last year.

A recent review of help-seeking patterns in OCD found lifetime help-seeking rates of 0-41% (Schwartz, Schlegl et al. 2013). Similarly, a report by the WHO investigated studies from 37 countries and found the median treatment gap for OCD was 57.3%, meaning this number did not receive treatment. Globally the figure is likely to be higher as data were not available from developing countries, where treatment services are more likely to be lacking (Kohn, 2004).

Researchers have consistently found that help-seeking in OCD is often delayed by a number of years, from onset (8 -17: (Pigott 2004; Stobie, Taylor et al. 2007). However, a recent study identified a mean delay of 3.28 years (standard deviation 4.25 years) (Belloch, del Valle et al. 2009) suggesting that the lag from onset to help-seeking may be improving. Although younger people are more likely to seek help (Goodwin, Koenen et al. 2002; Cullen, Samuels et al. 2008; Levy, McLean et al. 2013), those with earlier onset OCD may seek help later (Stengler, Olbrich et al.

2013), perhaps because the problem is seen more as part of their core personality, rather than as a separate difficulty that juxtaposes with other factors.

Comorbidity may drive people towards treatment – only 14% of those with OCD alone compared with 56% with comorbid disorders had sought help in the UK study (Torres, Prince et al. 2007). Fullana, Mataix-Cols et al. (2009) also found help-seeking to be positively associated with the presence of anxiety and depression and particularly related to the presence of aggressive/shameful obsessions. There is mixed evidence as to the type of OCD presentation that might lead people to seek help, with studies finding violent obsessions a driver (Mayerovitch, du Fort et al. 2003) or a barrier (Torres, Prince et al. 2006; Santana, Fontenelle et al. 2013) to help-seeking. Two studies have found that obsessions and not compulsions were associated with help-seeking (Mayerovitch, du Fort et al. 2003; Besiroglu and Agargun 2006).

Women are over-represented in treatment seeking samples and may be more likely than men to seek help (Fullana, Mataix-Cols et al. 2009; Veldhuis, Dieleman et al. 2012). Minority ethnic groups in predominantly white societies are less likely to seek help (Goodwin, Koenen et al. 2002) or may seek help via informal networks (Neighbors 1988) or physical health clinics such as dermatology (Friedman, Hatch et al. 1993).

A further reason for delay is that sufferers and those around them may not recognize their symptoms as part of a problem until the symptoms have progressed significantly (Coles and Coleman 2010). The person's own appraisal of thoughts as meaning they are 'bad' or 'mad' can lead people to conceal symptoms for fear of

judgment or reprisal (Newth and Rachman 2001; Belloch, del Valle et al. 2009). Lower insight may inhibit help-seeking (Demet, Deveci et al. 2010). Those who do not conceptualise their experiences as OCD but rather erroneously believe that they are guilty of terrible acts are likely to be hesitant to disclose symptoms. Consistent with this, those with a pre-existing diagnosis were more likely to attend a treatment clinic for evaluation (Levy, McLean et al. 2013).

Fear of misunderstanding and not receiving the correct help may interfere with help-seeking. People may not receive appropriate treatment for OCD due to a lack of disclosure and focus on other emotional symptoms during the consultation. Alternatively they may present in other services (e.g. dermatology) as a result of the impairment caused by their symptoms (Demet, Deveci et al. 2010).

Health-related beliefs (e.g. wishing to handle the problem alone) also have an impact (Goodwin, Koenen et al. 2002). Fears regarding psychological treatment have also been identified as a barrier to getting CBT in particular (Mancebo, Eisen et al. 2011). Lack of knowledge of CBT or assumptions it would not be helpful are also often cited barriers to access (Baer and Minichiello 2008).

Once services are approached it may still take some time to get a diagnosis of OCD – 2 years in one study (Stengler, Olbrich et al. 2013). (Wahl, Kordon et al. 2010) found that only 28% of a outpatient sample the researchers screened and confirmed as having OCD had also been given that diagnoses by their consultant. A vignette study suggested that professional's misidentification of OCD may be common (Glazier 2013).

Several studies have examined the reasons behind delayed or lack of help-seeking. The cost and availability of treatment are important barriers to seeking help, particularly in those countries where self-funding or private insurance is required. In a US study, 50% of those with OCD in an online survey reported seeking CBT, with only 33% actually receiving it (Baer and Minichiello 2008).

These studies highlight the urgent need to develop strategies for encouraging help seeking at times when it may be particularly important and people may be particularly receptive to intervention such as the perinatal period. A related issue is the effectiveness of early intervention in OCD. There is no published evidence in this area, but the context of perinatal OCD and the possibly enhanced motivation to tackle the problem to prevent possible effects on the infant may be conducive to engagement in treatment.

1.3.5 Interventions received in OCD

The evidence suggests that only a minority seek help for OCD. However, even once help is sought, the treatment received is often not of the recommended standard.

Crino, Slade et al. (2005) found that approximately half of those with OCD in an Australian sample who had sought help had received any intervention, and only 42.3% had received an evidence-based intervention. It is not clear why.

A US online survey (therefore a self selected sample) of 175 participants found that only 60% of the total was receiving treatment, but often not 'gold standard' treatment meaning SSRIs and/or CBT (Marques, LeBlanc et al. 2010). A US medical record survey found that 69.7% of those diagnosed with OCD received first-line OCD

pharmacotherapy but only 38.3% received a minimally appropriate trial of pharmacotherapy. (Hankin, Koran et al. 2009). Almost identical results were found in analysis of a physician-completed database of treatments for OCD which revealed that 65% of patients received an SSRI but only 39.4% received an adequate dose (Blanco, Olfson et al. 2006). The Blanco et al study found that only 7.5 % received CBT, and that those patients had the highest mean scores on the global assessment of functioning scale, suggesting there might be a relationship between high functioning and perceived suitability for CBT by practitioners.

In their large UK community study, Torres et al found that of 114 people with current OCD, only 5% percent were receiving cognitive-behavioral therapy, 2% were taking selective serotonin reuptake inhibitors, and 10% were taking tricyclics (Torres, Prince et al. (2007). In the UK, there is evidence that GPs, still generally the gatekeepers of treatment, may not have detailed knowledge of best practice for treating OCD (Gyani, Shafran et al. 2012).

Even if they are having CBT, the quality may be inadequate (Stobie, Taylor et al. 2007). Kulz, Hassenpflug et al. (2010) surveyed 177 therapists and found only 56% used exposure techniques in treating OCD. In a separate survey of patients with OCD they found that only 16.7% of 117 courses of psychological therapy undertaken involved exposure (Bohm, Forstner et al. 2008). Mancebo, Eisen et al. (2006) found 38% of people received adequate (defined as 13) sessions of CBT ever, with only 24% receiving 13 consecutive sessions. Once treatment is initiated rates of drop out are very high. In one US study, 46% of participants refused CBT, of those that did

start 51% dropped out. 51% refused medication and 61% did not adhere (Santana, Fontenelle et al. 2013).

Although attempts have been made to standardise the relevant competencies and content of CBT (e.g. CORE), this is hard to guarantee in everyday clinical practice (Stobie, Taylor et al. 2007).

It seems clear that only a small proportion of those with OCD seek help, are correctly diagnosed and given appropriate treatment at a time when it might have the optimal chance of making a long term change.

1.4 Development and onset of OCD

Given the prevalence and high burden in OCD, much research attention has turned to factors influencing the development of OCD. As with almost any disorder, the aetiology of OCD is likely to be complex and multifactorial, encompassing interacting genetic, environmental, biological and psychological elements. For all anxiety disorders etiology consists of a mix of vulnerability and life events; there is only a small amount of evidence for specificity of contributors to any disorder, with anxiety disorders showing strict (i.e. preceded by anxiety) and broad homotypic continuity (i.e. preceded by other internalizing disorders) (Gregory, Caspi et al. 2007).

This section will consider what is known about the transmission and development of OCD.

1.4.1 Family studies of parental anxiety disorders

Family studies of anxiety disorders have often used panic disorder or mixed groups containing a range of anxiety diagnoses. The evidence suggests that children of parents with anxiety disorders are more susceptible to anxiety disorders in particular, but are at risk for a broader range of disorders if the parent also has depression (Turner, Beidel et al. 1987; Beidel and Turner 1997; Unnewehr, Schneider et al. 1998; Biederman, Monuteaux et al. 2004; Biederman, Petty et al. 2006). Parental panic disorder was found to be a risk for childhood OCD and agoraphobia in one study, whereas parental social phobia and separation anxiety disorder conferred specific risks for those disorders in offspring (Biederman, Petty et al. 2006).

Moving away from clinical disorders, children of parents with anxiety disorders may be more prone to a range of more subtle difficulties such as compromised functioning at school or fewer strengths rather than more difficulties (Turner, Beidel et al. 1987; Challacombe and Salkovskis 2009).

In addition, more subtle markers of risk may differentiate the offspring of anxious parents such as physiological reactivity (Turner, Beidel et al. 2005) or anxious interpretation biases (Schneider, Unnewehr et al. 2002) although findings regarding interpretations have not found consistent differences (Unnewehr, Schneider et al. 1996; Schneider, Unnewehr et al. 2008). The reasons underlying such differences are still unclear.

1.4.2 Family studies of OCD

Family studies have consistently found raised rates of OCD at between 11-30% in first-degree relatives of sufferers (Lenane, Swedo et al. 1990; Pauls, Alsobrook et al. 1995; Nestadt, Samuels et al. 2000; Grabe, Ruhrmann et al. 2006). Relatives also seem more susceptible to a range of mood and anxiety disorders (Black, Noyes et al. 1992; Nestadt, Samuels et al. 2001; Black, Gaffney et al. 2003; Bienvenu, Samuels et al. 2012). Rates of anxiety disorders are higher in relatives of those people with early onset OCD (Black, Noyes et al. 1992).

Parents of children with OCD have been found to have greater levels of obsessive compulsive symptomatology and OCD than parents of healthy controls (Thomsen and Mikkelsen 1995; Reddy, Reddy et al. 2001; Calvo, Lazaro et al. 2007; Liakopoulou, Korlou et al. 2010).

The Johns Hopkins OCD family study (Nestadt, Samuels et al. 2000) compared 343 first-degree relatives of 80 adult probands recruited through a specialist clinic with 300 relatives of 70 matched controls. The study found that the lifetime prevalence of OCD was 4.7 times higher in first-degree relatives of OCD patients than controls (11.7% vs 2.7%). There were no cases of OCD in relatives of patients with an onset after age 17, leading the authors to suggest an early onset subtype that may be more influenced by familial factors. In a second study using this sample the authors reported more than a tenfold difference in lifetime prevalence rates of GAD, panic with or without agoraphobia, and increased rates of social anxiety and major recurrent depression in relatives of probands (Nestadt, Samuels et al. 2001). Social

anxiety disorder, panic disorder and depression occurred more frequently only in case relatives who also had OCD. The authors suggest a common familial aetiology for OCD, GAD and panic with agoraphobia.

In another study, although raised rates of OCD and other disorders were found, no particular familial aggregation in early onset cases was found by (Fyer, Lipsitz et al. 2005). In addition, these researchers highlighted the possible biasing effect that the inclusion of proband information may have by analyzing their data to give a best estimate of diagnosis, with and without this information. The inclusion of proband information was found to raise the prevalence; without it, no evidence of familial aggregation was found (Lipsitz, Mannuzza et al. 2005).

Albert, Maina et al. (2002) found that 11% of their OCD sample had a family member with OCD; it was not found to be associated with any particular clinical presentation. They did find that more life events occurred in the year before onset in those without a family history of OCD, possibly suggesting a higher threshold for the development of the disorder in these cases (Albert, Maina et al. 2002).

The interpretations of family studies are hampered by similar difficulties to prevalence studies in general, in particular the inclusion and definition of subthreshold symptoms of OCD. In addition the direction of causality and the distinction between heritability and familiarity is often not clear. Given the noted burden on family members, few studies consider whether the families cohabit and whether the relative's OCD may be a factor in triggering depression or other difficulties in family members.

In one of very few studies examining the children of parents with OCD Black, Gaffney et al. (2003) found raised rates of anxiety disorders in forty-three children (ages 7-18) of twenty-one parents with OCD compared with 35 children of controls. In particular, differences were found between rates of lifetime overanxious disorder (13%v3%), separation anxiety disorder (17 v 6%) and OCD (23% v 3%). Overall, 22% vs 9% had any anxiety disorders at follow up.

OCD diagnoses were not stable over time, with several children moving in or out of diagnosis at two year follow up. When subclinical OCD was examined, defined as 'the presence of obsessional thoughts or compulsive rituals that did not cause impairment or distress, or were not time consuming', the phenomenon was found in 30% children of OCD parents and 23% of control children which was not a significant difference. The authors combine the categories as 'broadly defined OCD' reporting the rates as 56% v 23%. The omission of the interference criteria at this point may have meant that normal rather than sub-clinical obsessions were included. Having a mother with OCD, evidence of family dysfunction and symptoms present at time 1 were predictive of this category of 'broadly defined OCD' at follow up. Taken at face value this may imply interaction of factors, possibly including the difficulty in helping a child with pathology that mirrors your own. This chimes with the more punitive parenting described by mothers with OCD specifically in situations where their child might exhibit obsessional rather than general anxiety (Challacombe and Salkovskis 2009).

Also using the CBCL, Challacombe and Salkovskis (2009) did not find raised rates of clinical anxiety in the children of 23 mothers with OCD compared with a group of

mothers with panic disorder and healthy controls. The children did not differ on an adapted measure of responsibility appraisals.

1.4.3 Genetic vulnerability and OCD

Overall, genetic studies indicate a largely non-specific heritability for anxiety disorders, with a high degree of comorbidity between anxiety disorders and with other mood disorders (Kendler, Walters et al. 1995; Middeldorp, Cath et al. 2005; van Grootheest, Cath et al. 2007; Trzaskowski, Zavos et al. 2012).

The raised familial prevalence of OCD in many studies has led to a search to identify specific genetic factors that may be involved. Studies have found a high heritability for OCD related behaviours in children (Eley, Bolton et al. 2003; Bolton, Rijsdijk et al. 2007) compared with for example a 73% heritability estimate for separation anxiety disorder in children (Bolton, Eley et al. 2006).

However, it has been difficult to determine a specific heritability or genetic locus for OCD, possibly due to varied methodological approaches (lack of standardised diagnostic criteria, small sample sizes, lack of blind assessments, assessment of obsessional symptoms rather than diagnosed OCD), and the complexity and heterogeneity of the illness itself (Pauls and Alsobrook 1999). In addition, the picture is also complicated by a high level of comorbidity, particularly with other anxiety and mood disorders in probands, and the finding that relatives display a higher number of a range of other psychiatric disorders.

Despite a proliferation of studies, genetic approaches have not so far identified consistent candidate genes in OCD (Pauls 2010; Liu, Yin et al. 2013; Stewart, Yu et al. 2013; Taylor 2013). Over 80 candidate genes have been identified with none so far reaching genome wide significance and only one being replicated. Genes related to serotonin regulation have been more consistently implicated although mechanisms remain unclear and this is unlikely to be specific to OCD (Lin 2007; Taylor 2013). Genetics are likely to be involved in a complex interplay with other genes, epigenetic effects and environmental factors (Pauls 2010; Iervolino, Rijsdijk et al. 2011; Taylor 2011).

As mentioned, some researchers have proposed that some 'subtypes' of OCD are more influenced by genetic factors, in particular 'early onset' OCD, with both obsessive compulsive behaviors and OCD under strong genetic influence (Bolton, Rijsdijk et al. 2007). Conversely, later onset OCD may be more accountable to environmental stress (Millet, Kochman et al. 2004; Rea, Labad et al. 2011). OCD is a heterogenous entity and it may be that particular symptom presentations such as ordering are more influenced by genetic factors (Hanna, Fischer et al. 2005). Other types of symptoms such as checking, washing and obsessional symptoms may be more related to belief domains which could be more environmentally influenced (Rea, Labad et al. 2011). The epidemiological picture suggests that women are more likely to be in the environmentally mediated subtype.

1.4.4 Psychological vulnerability factors in OCD

A number of factors are likely to make a contribution to the development of OCD including significant life events, relevant beliefs and personality factors which are likely to overlap and interact. Prominent amongst these "candidates" are beliefs, linked to varieties of cognitive theories, both for anxiety in general and OCD in particular.

1.4.4.1 Belief domains

Cognitive factors such as the perception of and response to threat are likely to be related to general risk for anxiety and may also be related to personality factors such as neuroticism. More specifically an important set of constructs related to the development and maintenance of OCD are belief domains. A range of belief domains have been associated with OCD in a number of cross-sectional studies. The Obsessive Compulsive Working Group pragmatically identified six domains of belief as important in OCD: responsibility (Salkovskis, Wroe et al. 2000), threat over estimation, perfectionism, need for certainty (Tolin, Abramowitz et al. 2003), importance of thoughts (Rachman 1997). Other concepts such as thought-action fusion have also been identified as relevant (Shafran, Thordarson et al. 1996). Measured by the Obesssive beliefs Questionnaire (OBQ), these condense into three or four factors (Steketee, Frost et al. 2003). Participants with clinical OCD have been found to be higher than healthy control participants in these domains (Steketee 2005).

The particular expression of symptoms has been related to specific belief domains. Research with clinical samples has shown that responsibility/ threat estimation has been linked with rumination and obsessive thoughts (Julien, O'Connor et al. 2006), and consistently with contamination/washing and neutralising (Tolin, Brady et al. 2008; Calleo, Hart et al. 2010; Wheaton, Abramowitz et al. 2010) but not invariably (Brakoulias, Starcevic et al. 2013).

Perfectionism/ intolerance of uncertainty has been linked with checking (Julien, O'Connor et al. 2006), obsessions (Tolin, Brady et al. 2008) and symmetry (Calleo, Hart et al. 2010; Wheaton, Abramowitz et al. 2010).

The importance and control of thoughts has been more consistently linked with impulse anxiety (Julien, O'Connor et al. 2006) and obsessions (Tolin, Brady et al. 2008; Wheaton, Abramowitz et al. 2010).

Interestingly no interaction effects were found between belief domains on symptoms in a study by (Taylor, Abramowitz et al. 2005), suggesting that they are separate contributory factors.

Although all these belief domains have been found to be associated with obsessional symptoms, few are specific to it, particularly when compared with other anxiety disorders, although people with OCD have been found to score more highly (Steketee, Frost et al. 1998; Tolin, Worhunsky et al. 2006). Only beliefs about the need to control thoughts were found to distinguish OCD from other anxiety disorders, after controlling for trait anxiety and depression (Tolin, Worhunsky et al. 2006).

In addition, also with the exception of the relationship between obsessions and thought control, a significant subsection of people with other forms of obsessional symptoms do not score highly on these belief domains (Taylor, Abramowitz et al. 2006). This highlights the heterogeneity of the disorder and the limitations of existing models in generating predictors for the development of all obsessive compulsive symptoms.

The question of whether these obsessive beliefs represent a vulnerability to OCD or result from symptomatology was investigated by Abramowitz, Khandker et al. (2006) in a study that found dysfunctional beliefs measured antenatally in mothers and fathers to be predictive of postnatal OCD symptoms, even when controlling for pre-existing symptoms. The perinatal context of this study is discussed in more detail in chapter 2, but it provides important evidence for the role of underlying beliefs in the pathogenesis of OCD. Coles and Horng (2006) investigated changes in symptomatology in a six week study of a non clinical group. In this case both beliefs and events predicted change in symptoms but did not interact. However, the population and short timeframe allowed may not have been suitable to detect an effect.

The question of how beliefs might be formed and in particular the influence of early environment and parenting is discussed in Chapter 3 below.

1.4.4.2 Temperament and personality

OCD has been associated with neuroticism, a general trait variable thought to also convey vulnerability to a range of disorders (Samuels, Nestadt et al. 2000; Hur 2009).

Neuroticism has also been associated with Obsessive-compulsive personality disorder which in turn is more common in people with OCD and their first degree relatives (Samuels, Nestadt et al. 2000). The evidence of an association between OCD and specific personality disorders is unclear: Crino, Slade et al. (2005) showed no association between OCD and any specific personality disorder although people with OCD were more likely to have a personality disorder overall (OR 3.3).

Perfectionism as a personality trait that has long been associated with OCD (Rheaume, Freeston et al. 1995; Chik, Whittal et al. 2008; Reuther, Davis et al. 2013), and is also raised in relatives of people with OCD (Rector, Cassin et al. 2009). Perfectionism has been associated with particular symptom dimensions such as ordering and symmetry (Wheaton, Abramowitz et al. 2010). Perfectionism is part of the criteria for obsessive-compulsive personality disorder (OCPD). OCPD is usually considered categorically and has been found to be more prevalent in people with OCD (26-47%) (Coles, Pinto et al. 2008) and first degree relatives of people with OCD (Gordon, Salkovskis et al. 2013; Starcevic, Berle et al. 2013). OCPD and perfectionism have been associated with symptom severity (Coles, Pinto et al. 2008; Wetterneck, Little et al. 2011) but the inclusion of hoarding symptoms in the diagnosis of OCPD could be a confound (Lochner, Serebro et al. 2011).

There are mixed results as to the effect of OCPD on treatment outcome (Pinto, Liebowitz et al. 2011). Aspects of perfectionism (as defined by Frost and Steketee,

1997) including concern over mistakes and doubts about outcome been found to predict poorer cognitive therapy outcome (Chik, Whittal et al. 2008). Storchheim and O'Mahony (2006) found beliefs to changes in tandem with symptomatology during successful CBT therapy; however change in symptomatology alone is not always linked with belief change (Grenier, O'Connor et al. 2008). Others have found that not only the presence of a belief but the strength with which it is initially held can influence treatment outcome (Foa, Abramowitz et al. 1999).

Reported childhood temperament, in particular behavioural inhibition, the tendency to be sensitive to and avoid novelty, has been found to predict OCD symptoms in adulthood in an unselected student sample (Coles, Schofield et al. 2006). Furthermore, this relationship appeared to be moderated by parental overprotection. Cross-sectional studies in childhood have not found a strong relationship between BI and OCD (Ivarsson and Winge-Westholm 2004).

The issue of the stability of traits and beliefs is important in refining treatments for OCD and developing a better understanding of malleable maintenance and risk factors. This includes factors that predispose to development of OCD or relapse after therapy.

1.4.5 Onset events in OCD

If beliefs and/or genetic vulnerabilities are part of the diathesis for the development of a disorder, it is likely that they interact with subjectively stressful environmental events to make the development of the problem more likely. Few studies have examined the transition from subclinical symptoms to full-blown disorder. In one

study to look at this, Coles, Hart et al. (2012) found that individuals that eventually developed full-blown OCD retrospectively reported that generalized anxiety, perfectionism, impaired work or school performance, social isolation, preoccupation with details and intolerance of uncertainty, frequently emerged after their initial OC symptoms but before full-criteria for OCD were met. Increases in stress level, the desire for things to feel 'just right', and the amount of attention paid to one's thoughts were perceived as having played an important role in the transition to OCD. Prospective results from the Dunedin cohort also show that social isolation, negative emotionality as well as lower IQ all predicted later OCD and obsessive compulsive symptoms in adulthood (age 26 or 36; Grisham, Fullana et al. 2011).

The context in which a disorder begins is important in terms of understanding the problem on the level of individual experience as well as the aetiology of the disorder more broadly. However, the relationship between the onset of a disorder and a particular event can be complex. Distal events may influence proximal factors that then play a role in the development of OCD. For example, a case series by Arnold (1999) noted that 6/7 of their sample of women with postpartum onset OCD had experienced sexual abuse which may only have become 'online' as a factor in the context of pregnancy and childbirth. It may be the interaction of more and less recent experiences (amongst other factors) that can then lead to the development of difficulties.

The only study to demonstrate specificity of type of life event and the onset of disorder is that of Finlay-Jones and Brown (1981), who demonstrated that loss

events were linked with depression whilst dangerous events were linked with anxiety. Those who experienced both types of events were most likely to develop mixed depression and anxiety. Stressful life events and trauma have been implicated in the development of OCD (de Silva and Marks 1999), particularly in those with an onset in adolescence or adulthood (Millet, Kochman et al. 2004). When comparing lifetime rates of severe traumatic events in people with and without OCD, no differences were found by Grabe, Ruhrmann et al. (2008), suggesting that for most people traumatic events are not the main trigger for obsessional difficulties. By comparison, rates of OCD of 40% in people with PTSD have been reported (Nacasch, Fostick et al. 2011).

A recent study by Rosso, Albert et al. (2012) found that 60.9% of their sample of 329 people with OCD had experienced at least one life stressful life event in the 12 months prior to onset of significant OCD symptomatology, with 24.9% experiencing a very stressful life event. Women were more likely to develop OCD following a stressful life event (OR=2.15) and very stressful life event (OR=2.91). This finding may have been influenced by the inclusion of gender-specific (or gender weighted) events such as miscarriage and unwanted pregnancy in the list of life events shown to respondents. The presence of stressful life events prior to onset was also related to a more sudden onset and the development of somatic obsessions. Importantly, the study did not enquire about significant positive life events which may have caused stress in oblique ways. Unfortunately this study did not compare their sample with healthy controls or people with other difficulties.

Maina, Albert et al. (2000) did compare people with and without OCD in terms of the number of life events in the twelve months preceding onset and found no difference in the frequency of life events, but postpartum events and obstetric complications during pregnancy were more frequently cited by women with OCD. No other events were found to distinguish the groups.

Rea, Labad et al. (2011) found that in their sample of 417 people with OCD, those whose OCD had been preceded by a stressful life event had a later onset, a history of complicated birth, less family history and were more likely to have contamination/cleaning obsessions.

Therefore it appears that for some people with OCD, stressful life events may play an important role, with pregnancy and childbirth potentially being a significant event of particular importance in the development of OCD in women, both pragmatically and theoretically. These issues are discussed in more detail below.

As with all disorders, susceptibility to OCD is due to a combination of underlying and environmental factors. There is little detailed evidence concerning specific genetic contributors to OCD; belief domains including responsibility have been implicated as relevant in the development of the disorder.

1.5 Chapter 1 conclusions

- *Overall the evidence suggests that OCD affects approximately 1.2% of people at any one time and it can become a chronic disorder if untreated.*

- *OCD affects women more than men, affects women later than men, and women may be more susceptible to the influence of stressful events in the onset of the problem.*
- *A better understanding of shifts in symptom presentation and severity of OCD and how these affect lifetime and point prevalence, as well as rates of incidence and subsyndromal OCD, can contribute to accurately assessing the scale of the problem and the resources required to treat it.*
- *OCD is a cause of significant impact on quality of life in those that suffer the disorder and those around them, with the problems likely to be aggravated by low levels of help-seeking and inadequate service provision.*
- *Perinatal identification of those with or at risk of developing OCD is a particularly appropriate candidate to resolve many of these issues as it is a time when people are often receptive to help due to the potential impact on the mother and child in the postnatal period, especially as pregnancy itself may trigger OCD. Thus "early identification and intervention" could become a reality in this group.*

2. OCD during pregnancy and the postnatal period

Pregnancy and childbirth is well known to be a time of increased risk for a range of psychiatric disorders (Andersson, Sundström-Poromaa et al. 2006; Ross and McLean 2006). There has also been increasing recognition of the vulnerability of new fathers to psychiatric illness at this time (Ramchandani, Stein et al. 2005). The perinatal period is of particular complexity as an onset event for psychological difficulties given the interplay between biological, psychological and broader environmental factors as well as role changes for individuals and changing dynamics within the family system. The physical and psychological experience of pregnancy can be negative for women, and the current context of the pregnancy as well as past experiences of pregnancy can contribute to the development of clinical mental health problems (Geller 2004).

Although the link between the perinatal period and depression is well established (Gavin, Gaynes et al. 2005), clinical and research attention has turned been extended in recent years to the spectrum of disorders at this time and the differential presentations and impact that they might have on women and their infants (Matthey, Barnett et al. 2003). A range of studies have explored OCD in the perinatal period.

2.1 Retrospective studies

The first indications of a possible connection between childbearing and OCD came via retrospective studies of OCD. An association was identified in a handful of early studies: a 1957 study used self-report and notes review to gather information about onset events in a sample of 150 people with 'obsessional states' recruited from two settings (Pollitt 1957). 10/93 (10.8%) participants reported pregnancy (n=3) or childbirth (n=7) as a precipitant for OCD. Two other studies at this time also found that pregnancy and childbirth were reported as onset events: (Ingram 1961) found 15/89 (16.9%) and (Lo 1967) found an association in 4/88 (5%) of a Chinese sample. In each of these studies, breakdown by gender is not provided and the reliability of diagnosis, for example in Pollitt (1957) that of an 'obsessional state' made by a single clinician in an outpatient setting and a number of clinicians in a hospital setting is questionable, particularly in light of the changes in modern diagnostic criteria and the impact of even small changes on prevalence rates in large studies (Crino, Slade et al. 2005).

Studies examining relationships between the specific context of the perinatal period and OCD only began to gather interest in more recent years, in tandem with better psychological and psychiatric models to understand the disorder.

Davidson and Robertson (1985) and Brandt and Mackenzie (1987) reported single cases of longstanding OCD exacerbated by pregnancy. Subsequently, Buttolph and Holland (1990) used a questionnaire to investigate relationships between OCD and pregnancy and childbirth for clients attending an OCD outpatient clinic. A modest

60/180 (33%) responded, of whom 39 were females. One of the male respondents (4%) reported his OCD had worsened with the birth of his two children, while 27/39 (69%) females reported onset or worsening during pregnancy or after childbirth. 6 (22%) of their female sample reported that their OCD had begun in pregnancy and 3 (11%) said pregnancy had worsened symptoms. For 6 (22%) onset occurred after the birth of their first child, while 4 (15%) said that their OCD worsened at this point.

Labad, Alonso et al. (2010) investigated the relationship between obsessive compulsive symptoms and menarche and found that 25% of the sample with children (10% of total) reported onset during pregnancy (2/2.2%) or postpartum (9/20%).

In one study retrospectively examining onset events in 106 women with OCD attending a US outpatient clinic specializing in OCD, of the 59 with children, 23 (39%) of these had experienced the onset of their symptoms during pregnancy, mostly for the first or second child (Neziroglu, Anemone et al. 1992). Only one (1.7%) of the 59 patients with children reported a decrease in symptoms in pregnancy. Those with children reported a later age of onset than those without (22-24 and 29-32 versus 13-15 years). Three women who had experienced an abortion reported onset during the pregnancy (of five who had experienced either miscarriage or abortion). The symptoms disappeared once the pregnancy terminated but these women subsequently (after a period of years) relapsed. This study found pregnancy to be the most cited onset event for OCD (39% of women with children; 21.7% of the whole sample), followed by panic attacks (6.6% of whole

sample). The majority (18/59 women with children and 26/47 without) were unable to identify a particular onset event (Neziroglu, Anemone et al. 1992). In an interview with 10 women from each group designed to explore the related context in more detail, it is of note that some women with children reported that pregnancy had *not* been a particularly stressful time, with their OCD being the only cause of stress. Sadly, in the group without children the chronicity of the disorder and feelings that they could not cope with childrearing were reported by some women as an influence on the decision to remain childless.

Sichel, Cohen et al. (1993) identified 15 women meeting DSM-III-R criteria for OCD with postnatal onset from a retrospective review of notes of attendees of a women's psychiatric service. Time to onset of symptoms was 2 days to 4 weeks, with all women rated as 5: 'markedly ill' to 7:'amongst the most ill patients I have seen' on the CGI at presentation.

Williams and Koran (1997) reviewed outpatient clinic records over a five year period to identify all female patients with OCD, and interviewed 57 of 72 of those eligible in order to determine relationships between OCD and pregnancy, the postnatal period and the premenstrum. Patients were asked to rate the percentage by which their OCD worsened, with a subjective decline of 20% considered clinically meaningful. Age of onset was lower in the never pregnant than ever pregnant group. 5 (13%) of the sample reported onset during pregnancy (4 with their first and 1 their second pregnancy). No women in this study reported postnatal onset. The majority of women with pre-existing OCD (20/29, 69%) reported no worsening of symptoms during pregnancy. 5/20 worsened and 4 improved. 7/24 women who

delivered reported a postnatal worsening of symptoms. Unfortunately no objective measure of OCD severity was reported, so the study cannot shed light on the range of interference or type of symptoms experienced by the sample (aside from that they experienced both 'obsessions and compulsions' p.332).

Maina, Albert et al. (1999) investigated events in the year prior to onset in people with OCD compared with a control group. Overall, the number of life events in people with and without OCD in the year preceding onset did not differ. For women with OCD (n=33), childbirth was the only event that occurred with greater frequency than for controls. Eight women (24%) reported postnatal onset of symptoms within the first four weeks postpartum and one during the third trimester of pregnancy (a lower rate than in other studies).

Forray, Focseneanu et al. (2010) examined onset events in women with OCD who had ever and never been pregnant. Of 78 women in the ever pregnant group, 32.1% (n = 24) had OCD onset in the perinatal period (perinatal-related group), 15.4% in pregnancy, 14.1% at postpartum, and 1.3% after miscarriage. Of 132 total pregnancies, 34.1% involved an exacerbation of symptoms, 22.0% involved an improvement in OCD symptoms, and 43.9% did not change symptom seventy in women with pre-existing illness.

Overall, these retrospective studies which use a variety of methods and samples indicate that pregnancy or childbirth are consistently cited onset or exacerbation events for OCD in women and some men. However, for some women with OCD

during pregnancy, symptoms can improve postnatally, and furthermore in those with OCD the occurrence of a pregnancy can lead to improvement of symptoms.

2.2 Prevalence and incidence studies of perinatal OCD

Given the direct relevance to the current thesis, the existing studies of the prevalence of perinatal OCD will be discussed in detail. Only studies which include a representative sample of pregnant women with the aim of establishing prevalence of diagnosed OCD (rather than obsessive compulsive symptoms) are included here.

2.2.1 Pregnancy studies

Ten cross-sectional studies have examined the rate of OCD during pregnancy. Each study was conducted at a different point in pregnancy with most being conducted in the third trimester of pregnancy.

Uguz, Gezginc et al. (2007) screened 434 (of a possible 566) women referred to Turkish university research centres in the third trimester of pregnancy and used the SCID to establish DSM-IV diagnosis. This study found a prevalence rate of 3.5%.

In a study designed to assess the relationship between pregnancy fear of childbirth and anxiety disorders, Zar, Wijma et al. (2002) screened 506 women using a questionnaire specifically designed for the study, a proportion of whom were followed up with the ADIS-R to establish diagnoses. Only one woman (0.2%) met criteria for OCD. No psychometric information is provided for the screener, leaving it unclear how effective it was in identifying OCD or other anxiety disorders.

A large screening study in a representative Swedish population based sample of 1555 women by Andersson, Sundström-Poromaa et al. (2003) found a point prevalence of 1.3% of OCD during the second trimester of pregnancy, which was the single most common anxiety disorder. A second study followed up a subsample of 720 women which included all of those who had confirmed antenatal psychiatric disorders plus a random sample of 250 who had screened positive for disorders which were subsequently not found to meet threshold and 250 who screened negative. The rate of OCD at 6 months postpartum in this selected subsample was 2.8%, having been 2.5% in pregnancy in the same sample. This small increase contrasts with a overall decrease in rates of diagnosis of other anxiety disorders and depression from ante- to postnatal (Andersson, Sundström-Poromaa et al. 2006).

Sutter-Dallay, Giaconne-Marcesche et al. (2004) found a prevalence of 1.2% for OCD in the third trimester in a French community sample. Antenatal anxiety disorders were found in 24% of women, with agoraphobia being the most common at 14%, followed by GAD (8.5%) and panic disorder (1.4%). There was evidence of comorbidity with depression which was diagnosed in 5% of the anxious participants. Women with pregnancy anxiety disorders were 2.6 times more likely to exhibit postnatal depression (above threshold EPDS score). Unfortunately no diagnostic interview was carried out in the postnatal part of the study and the EPDS has been found to have a high false positive rate in previous research (Pawlby, Sharp et al. 2008).

Only two studies have used a concurrent control group to compare rates between pregnant and non pregnant women. A Nigerian study with an excellent take-up

rate of 95%, found a rate of OCD of 5.2% in a sample of 172 pregnant women compared with 1.7% in a non-pregnant control group matched for socio-economic variables, a difference which was not statistically significant. This contrasts with the Nigerian population study which found a 12 month prevalence rate of 0.1% (Gureje, Lasebikan et al. 2006). Overall, 39% of the pregnant sample were found to have an anxiety disorder compared with 16.3% of controls, a difference which was found to be significant. However, women receiving current treatment for mental health conditions were excluded from both groups which may have led to an underestimate of prevalence rates (Adewuya, Ola et al. 2006).

A further study by the Turkish group compared rates of anxiety and mood disorders between pregnant and non-pregnant women. This included a sample of 309 women from a possible 388 (79.6%), using non-pregnant female hospital staff and their relatives as the control group. This study established a prevalence rate of 5.2% in the pregnant group which again did not differ significantly from the 2.8% rate in the control group (Uguz, Gezginc et al. 2010).

Chaudron and Nirodi (2010) invited women attending an academic obstetric clinic to participate in a study of OCS during pregnancy and postnatally. It is not clear how the sample was selected or if they were consecutive. The group appeared representative in terms of spread of socio-economic variables. 44/82 participated and completed questionnaires but unfortunately only 24 women completed the clinician administered measures to confirm diagnosis antenatally. Of these, 7 (29%) women met criteria for OCD, one of whom had comorbid depression. Given this very low take up, this figure must be interpreted with caution. 5/7 women had

childhood onset OCD and 2/7 with unknown onset. Therefore no cases appeared to be associated with pregnancy.

Felice, Saliba et al. (2007) recruited a randomly sampled population of pregnant women attending routine antenatal appointments in Malta at 18 weeks and 36 weeks. 229 completed antenatal interviews with the CIS-D. One woman met criteria for OCD at 18 weeks which had been present prior to pregnancy but was untreated.

Borri, Mauri et al. (2008) conducted a large population based study of 1066 women assessed at 12 weeks gestation, representing a takeup rate of approximately 50% (further women were excluded on the basis of subsequent miscarriage). The authors report a current prevalence for OCD of 1.6%, with a lifetime prevalence of 3.6% reported in this study. Anxiety disorders were the most common cause of morbidity in early pregnancy with an overall prevalence rate of 21.7% with specific phobia (10.7%), panic (4.0%) and social phobia (3.8%) being the most common disorders. Mood disorders were present in 8.8% of the sample.

Finally a Japanese study used midwives to interview a community sample of 209 women for DSM-III disorders using an 'ad hoc' rating scale. They found a prevalence of 0.7% during pregnancy (Kitamura, Yoshida et al. 2006).

Study		Sample size (takeup rate)	When assessed (AN=antenatal; PN = postnatal)	Assessment measures	Prevalence of OCD (%)	Comorbidity with depression
Uguz, Gezginc et al. (2007)	Turkey	434 (76.7%)	35 weeks AN (range 27-42)	SCID interview	3.5	-
Uguz, Gezginc et al (2010)	Turkey	309 (79.6%)	23.2 weeks (sd=9.5)	SCID interview	5.2	2.8
Andersson, Sundström-Poromaa et al. (2003)	Sweden	1555 (89.4%)	20 weeks AN	PRIME-MD (screener + clinician follow up)	1.3	-
Zar, Wijma et al. (2002)	Sweden	506 (63%)	28 weeks AN	Screener and ADIS-R	0.2	-
Sutter-Dalay et al, (2004)	France	598 (63%)	Third trimester (>24 weeks AN)	MINI	1.2	-

Study		Sample size (takeup rate)	When assessed (AN=antenatal; PN = postnatal)	Assessment measures	Prevalence of OCD (%)	Comorbidity with depression
Adewuya, Ola et al (2006)	Nigeria	172 (95%)	32 weeks and above	MINI interview	5.2	-
Chaudron and Nirodi (2010)	USA	44 (54%) 24/44 completed AN measures;	30-37 weeks AN	SCID interview (AN only) OCI-R,EPDS, YBOCS,	29	42.9
Felice, E et al (2007)	Malta	229 (95%)	18 & 36 weeks AN	CIS-D interview	0.4	-
Borri et al (2010)	Italy	1066 (49.9)	12 weeks	SCID interview	1.6	-
Kitamura et al (2006)	Japan	209 (41.2)	'late pregnancy'	Modified interview (DSM-III-R)	0.7	-

Table 2: Antenatal prevalence studies of OCD

Participation rates varied at 54-95% for these studies, with the remainder refusing or being excluded on the basis of language difficulties or other criteria. In some studies the women were recruited consecutively, whereas the Turkish study recruited women attending 'university clinics'.

The reported prevalence of OCD during pregnancy therefore ranges from 0.2-29% The study by Chaudron and Nirodi which produced the highest figure appears to significantly limited by the small numbers who completed robust diagnostic measures and can be considered an outlier. Excluding this study, the median is 1.45%. All of the studies with the exception of Kitamura and Zar (2006) used trained mental health professionals to administer validated measures. The prevalence in those studies appears to be much lower. However, even in the more robust studies the reported prevalence during pregnancy appears to vary greatly.

2.2.2 Postnatal studies

Interestingly, far fewer studies have examined the prevalence of OCD in the postnatal period. The studies discussed below describe rates of OCD found postnatally rather than purely postnatal onset OCD (which would also be included in these studies). In an American study, Wenzel, Haugen et al. (2005) interviewed 147 women recruited via birth advertisements in a local paper at 8 weeks postpartum and established a prevalence of OCD of 2.7%. Three of the four cases identified had postpartum onset OCD. A further 8 (5.4%) cases of subclinical OCD were identified, two of whom had postpartum onset.

Zambaldi, Cantilino et al. (2009) interviewed a sample of convenience of 400 Brazilian women at between two and twenty-six weeks postpartum. These investigators used the MINI to establish the diagnosis of OCD and found a prevalence of 9% (n=36). The presence of OCD was associated with a history of previous psychiatric disorder (not specified), concurrent somatic disease, obstetric complication in pregnancy/birth, and with being multiparous. 9 (2.3%) of the sample reported postpartum onset. Unfortunately no detail as to the onset for those with pre-existing OCD was reported, leaving unanswered the question of whether previous pregnancies had triggered the obsessional problems. 38.9% of mothers diagnosed with OCD were also diagnosed with depression, compared with 4.1% in the non-OCD group.

The study by Chaudron and Nirodi (2010) described above in the pregnancy section also administered the OCI-R, EPDS and YBOCS postnatally. However, the YBOCS was only administered with a subset of 16 out of a possible 44 participants. Postnatally, YBOCS scores of above 8 were reported in 5/16 (31.3%) women that completed the interview. Postnatal diagnoses were not confirmed by the researchers.

A follow up assessment in the Japanese study of Kitamora and colleagues combined assessment data for postnatal assessments conducted over the twelve months postnatally as many were missing at each data point. In a community sample of 209 women they found a prevalence of 1.7% over the 12 months postpartum according to DSM-III OCD criteria (Kitamura, Yoshida et al. 2006).

A Spanish study screened all participating women attending a university hospital over a one year period using the EPDS. A subsample of 405, selected from stratified

EPDS scores and employment status in the whole sample, were interviewed for DSM-IV disorders at 6 weeks postpartum. This study found a prevalence of 0.7% for OCD (Navarro, Garcia-Esteve et al. 2008). However, the screening instrument (EPDS) was not designed to identify OCD, although it has been found adequate to identify anxiety in general (Matthey, Fisher et al. 2013).

Miller, Chu et al. (2013) administered the PHQ, the STAI and the self-report YBOCS at 2-3 weeks postpartum and 6 months postpartum in a sample of 329 women. Using the YBOCS cutoff of 8 as representing clinically significant scores, they found 11% of women reported clinical levels of OCD at both 2-3 weeks and at 6 months postpartum. At 6 months, the depression and anxiety screens were not associated with YBOCS scores. Above threshold YBOCS scores were stable in 45% of participants; 51% who screened positive at 6 months had screened negative at 2 weeks. The self report version of the YBOCS has been found to be reasonably consistent with the clinician-rated measure but with a greater self report of symptoms on the checklist (Steketee, Frost et al. 1996; Federici, Summerfeldt et al. 2010).

Study		Sample size (takeup rate)	When assessed (AN=antenatal; PN = postnatal)	Assessment measures	Prevalence (%)	Comorbidity with depression (%)
Wenzel, Haugen et al. (2005)	USA	147 (54.2)	8 weeks PN	SCID interview	2.7	25.0
Zambaldi, Cantilino et al. (2009)	Brazil	400 (not reported)	2-46 weeks PN	MINI interview	9	38.9
Kitamura et al (2006)	Japan	209 (41.2)	Over first 12m PN (combined data)	Modified interview (DSM-III-R)	1.7	-
Navarro et al (2008)	Spain	405 (94.6%)	6 weeks	SCID interview	0.7	-
Chaudron and Nirodi (2010)	USA	16 /44 completed PN measures	1 month PN	OCI-R,EPDS, YBOCS, (self-report)	31	40
Miller et al. (2013)	USA	461 (72%)	2-3wks PN	PHQ-9, STAI, YBOCS (self-report)	11.1	70.6
		329 (51.9%)	6 months PN		10.6	42.9

Table 3: Postnatal prevalence studies of OCD

Those studies using clinician ratings have produced lower prevalence rates than those using self-report screening measures. Representativeness is a possible issue in the existing postnatal studies; no refusal rate is reported in Zambaldi, Cantilino et al. (2009) who recruited a sample of convenience. High levels of refusal and dropout were reported in the studies of Chaudron and Nirodi (2010) and (Wenzel, Haugen et al. 2005) and (Kitamura, Yoshida et al. 2006). In Miller's study an (affluent) college educated population comprised 86% of the sample.

Prevalence rates for postnatal OCD range from 0.7-11.1% with a median of 2.7% (excluding Chaudron and Nirodi as an outlier).

2.2.3 Incidence of postnatal OCD

In the only study to examine the incidence of purely postnatal OCD (Uguz, Akman et al. 2007) interviewed women in a general maternity hospital at an initial interview on the day after birth, excluding women with current or historical OCD or subclinical OCD. 580 women were approached; 127 (22%) women refused to participate and a further 10% were excluded on the basis of reasons including OCD, current depression and serious health problems with the baby leaving a sample of 302. A diagnostic interview was repeated at 6 weeks (with 92 (30%) refusing follow up) which found an incidence of 4.0% (n=12), mostly in primaparous women. Symptoms had developed within 2-4 weeks of birth, mostly focusing on contamination (75%), aggressive thoughts (33.3%) and symmetry/exactness (33.3%). The mean YBOCS score was 23.58 (standard deviation 3.8). Socio-demographic and obstetric variables did not distinguish women with postpartum onset OCD from women in

the sample who did not develop the problem, but personality disorders were more frequent, particularly OCPD and avoidant personality disorder. The effect of interviewing women on the day after they had given birth is not commented on. The authors found symptoms to be less severe than in a control group of 30 mothers with non postpartum onset OCD, although the non postpartum group was a help-seeking sample, who had presumably had OCD for more than the 2-4 weeks in the PPOCD group.

Chaudron and Nirodi (2010) reported an incidence of 12.5 based on changes in YBOCS scores from antenatal (<8) to postnatal (>8); however, this is based on self-report from only two women, who were not subsequently confirmed as having a diagnosis of OCD by clinician interview (e.g. using the SCID). As mentioned, the study has significant limitations in terms of numbers and methodological robustness.

2.2.4 Relative risk of OCD in the perinatal period

Further large prospective studies are required to assess the relationship between antenatal and postnatal obsessive symptomatology. In lieu of this data, McGuinness, Blissett et al. (2011) examined rates of OCD in three Turkish studies which provided data on community, pregnant and postpartum women (Cilli, Telcioglu et al. 2004; Uguz, Akman et al. 2007; Uguz, Gezginc et al. 2007) in which the prevalence rates were 3.3%, 3.5% and 4% respectively. The relative risk analysis was not significant (McGuinness, Blissett et al. 2011). A larger meta-analysis encompassing the studies discussed above used a similar methodology to compare

rates during pregnancy and the postpartum with national or regional prevalence estimates. Removing outliers, mean prevalences of OCD were 1.08% in the general population, 2.07% in pregnancy and 2.43% in the postpartum. This analysis found a risk ratio of 1.45 in pregnancy and 2.38 in the postpartum (Russell, Fawcett et al. 2013). Although the studies were rated for quality in this meta-analysis, four of the seventeen prevalence studies included were based on selected or referred psychiatric samples rather than estimates of prevalence in the general population (and therefore were not discussed above). Three of the six postnatal studies included used this methodology; therefore results of this meta-analysis should be interpreted with caution. In addition, as the authors point out, the general population comparison samples are likely to have included pregnant or postnatal women, thereby further complicating the interpretation of the results. As noted, the two studies comparing a pregnant and non pregnant control group for rates of OCD did not find a significant difference (Adewuya, Ola et al. 2006; Uguz, Gezginc et al. 2010).

In summary, the studies of the prevalence of OCD during pregnancy and the postnatal period suggest a raised prevalence relative to the 1.2% figure in the general population. However, this difference may not be clinically significant. Large representative studies are required to clarify this issue.

2.2.5 Course of perinatal OCD: onset versus exacerbation

The issue of whether the prevalence figures represent onset of new cases of OCD rather than exacerbation of existing symptoms is important in understanding aetiology and any systematic difference between groups.

Rapid onset of OCD has been reported both during pregnancy (Hertzberg, Leo et al. 1997) and more commonly postnatally, sometimes within the first 2-4 weeks after birth (Sichel, Cohen et al. 1993; Uguz, Akman et al. 2007). Rapid pregnancy onset and relatively quick postnatal recovery from symptoms was reported in two case studies of OCD limited to pregnancy, based on retrospective patient report alone (Iancu, Lepkifker et al. 1995; Kalra, Tandon et al. 2005). Forray et al (2010) did not find any significant differences in speed of onset between women with OCD with and without perinatal onset but note that 7/10 who reported postpartum onset experienced this 'straight away'.

Other retrospective studies have indicated a mixed picture regarding course of symptoms. Arnold (1999) recruited a sample of convenience of women with current postnatal OCD for a case series. 4/7 had experienced onset of their OCD in a previous postnatal period, whilst the remainder had an onset related to the current child. All reported the beginning of symptoms in the first 12 weeks postpartum with a range of 2 days to 12 weeks. (Forray, Focseneanu et al. 2010) found that antenatal onset occurred in 12/78 cases of women who had ever been pregnant and in 11/78 cases postnatally. This study also notes that different pregnancies had different effects for individuals. Reporting on the effect of all

pregnancies in the group on OCD symptoms, 34.1% worsened, 22% improved whilst the majority 43.9% reported no change. Unfortunately, the study again does not distinguish between whether these changes occurred during pregnancy or during the postnatal period.

Maina, Albert et al. (1999) report that (7/8) 87.5% of their group experienced the onset of subclinical symptoms prior to pregnancy, with a latency of 3.4 years from symptom to disorder onset. Four indicated no change in symptomatology during pregnancy, with three reporting improvement. For one person, symptoms began in pregnancy and began to interfere postnatally. Therefore onset was described as being within 4 weeks of birth for all eight women in this retrospective study who had identified childbirth as a precipitant. Unfortunately the magnitude of symptom change is not reported.

The vast majority of women (13/15) diagnosed with OCD during pregnancy in the prevalence study of Uguz, Gezginc et al. (2007) reported pre-existing symptoms. These had worsened during pregnancy for 6 women and decreased in 3, with 4 experiencing no change. No measure of the magnitude of change was reported.

A further study from this group reported on a sample of 16 (of 24 initially eligible) women who had OCD at 38 weeks gestation who were followed up at six weeks (Uguz, Gezginc et al. 2007). Three of the women had experienced onset during pregnancy, whilst others reported onset to be prior to pregnancy, although it had been undiagnosed in 9 of them (and may have been subclinical). At 6 weeks postpartum, 11 women (68.7%) reported a decrease in symptoms according to

YBOCS scores, with 8 of these experiencing a 25% decrease. Five women got worse, but three of those had only a 10% increase from initial YBOCS scores.

The same group of Uguz et al reported on a sample of 52 Turkish women with pre-pregnancy onset OCD, who were interviewed during pregnancy retrospectively about whether symptoms had changed during pregnancy (Uguz, Kaya et al. 2011). This study found that symptoms worsened in 17 (32.7%), unchanged in 28 (53.8%) and decreased in 7 (13.5%) of sample. Comparing the group that deteriorated with the combined latter groups, those that got worse had more depression and anxiety diagnoses at the start of pregnancy and were more likely to be experiencing contamination/washing and symmetry/ordering symptoms of OCD. They found that those with religious obsessions were more likely to stay the same or improve in symptoms. However, the YBOCS checklist was used to determine the presence/absence of symptoms; neither the current severity of OCD nor the *degree* of deterioration or improvement was quantified.

Another study from the Turkish group reported a follow up at one year postpartum of the 11 (out of 12) women identified with postpartum onset OCD at 6 weeks in a previous study (Uguz, Akman et al. 2007). They found that 8 of the 9 who had not received treatment were still clinically symptomatic with YBOCS scores of about 24. Of two women treated (with Sertraline), one had improved whilst the other had improved slightly (Uguz, Kaya et al. 2008).

In terms of obsessive-compulsive symptoms, Miller et al's (2013) study found that 2 participants (3.8%) self-reported a prior diagnosis of OCD, both in the group that screened positive for OCD. However the reliance on self-report data leaves open

the question of whether the high levels of symptomatology reported in this study relates to new onset or exacerbation of existing subclinical symptoms.

Brockington, Macdonald et al. (2006) noted that of 14 women identified as having obsessional symptoms in pregnancy in their referred sample (from a total of 129), four improved postnatally while 10 did not. Furthermore an additional 6 developed symptoms postnatally. Taking a broad definition of obsessionality, (22/18%) had some obsessional difficulties in the postpartum compared with 14/10.9% during pregnancy.

Given the differing methods and aims of the studies that report data on the course of OCD in the perinatal period it is difficult to form strong conclusions. Studies from the Turkish group represent a significant proportion of the available literature, and it is not completely clear that these studies do not report on some of the same samples. It is possible that symptoms can be exacerbated by any given pregnancy and the cross sectional studies may miss the fact that symptoms have started in previous pregnancies.

It is clear that it is possible for symptoms to worsen or improve during pregnancy or postnatally. For those with pre-existing OCD, withdrawal of medication prior to pregnancy or soon after conception may contribute to the precipitation of symptoms (Brandt and Mackenzie 1987; Altshuler, Hendrick et al. 1998).

Study	**Type**	**New case Or pre-pregnancy?**	**Pregnancy OCD**			**Postnatal OCD**		
			Worse	**No change**	**Improved**	**Worse**	**No change**	**Improved**
Hertzberg (1997)	Case study	Rapid onset during pregnancy; Resolved soon after	1	-	-			1
Iancu et al (1995)	Case study	OCD limited to pregnancy	1	-	-			1
Kalra (2005)	Case study	OCD limited to pregnancy	1	-	-			1
Sichel (1993)	Case series – retrospective chart review	Postnatal onset 2 days-4 weeks after delivery				15	-	-
Arnold (1999)	Case series – retrospective report	Postnatal 2-12 days onset				8/8		
Maina (1999)	Retrospective Survey of onset events in OCD	7/8 pre-pregnancy OCD 1/8 new	1/8	4/8	3/8	-	-	-
Forray (2010)	Retrospective study of ever-pregnant women with OCD	12/78 pregnancy onset 11/78 postnatal onset. (1/78 miscarriage) Reports on 134 pregnancies	34.1%	43.9%	22%	-	-	-
Uguz (2007a)	Follow up study of women with pregnancy OCD	3/16 pregnancy onset 13/16 pre-pregnancy	-	-	-	5/16	0/16	11/16

Study	**Type**	**New case Or pre-pregnancy?**	**Pregnancy OCD**			**Postnatal OCD**		
			Worse	**No change**	**Improved**	**Worse**	**No change**	**Improved**
Uguz (2007b)	Pregnancy prevalence study & comparison with non pregnant OCD	2/15 pregnancy onset	6/15	4/15	3/15	-	-	-
Uguz (2011)	Follow up study of pre-pregnancy OCD	52/52 pre-pregnancy	17/52	28/52	7/52	-	-	-
Uguz (2008)	Follow up study of postnatal OCD	11	-	-	-	-	8	3

Table 4: Studies examining the course of OCD during pregnancy and the postpartum

Evidence regarding the prevalence and relative risk of OCD in the perinatal period is far from clear. However, it is more certain that for a subgroup of women pregnancy and childbirth do represent trigger factors for the development of OCD. Onset can be sudden during pregnancy or postnatally and symptoms can persist if untreated.

2.3 Predictors of perinatal OCD

Given the prevalence of postnatal OCD seems to be no less than at other times, and that childbirth is a relatively predictable event, researchers have begun to investigate factors that may predispose individuals to the development of obsessional symptoms.

2.3.1 Socio demographic characteristics and perinatal OCD

Maternal age and socio-economic status were not found to differentiate women with OCD in pregnancy or the postpartum and non perinatal OCD in a Turkish study (Uguz, Akman et al. 2007). However, using self-report measures to establish clinical levels of symptoms, Miller (2013) US study found that mothers with OCD symptoms differed from those without in terms of being of younger age, more likely to be unmarried and having lower educational attainment.

Childhood sexual trauma was not systematically investigated in most studies but was reported in 5/6 of Arnold's sample (1999), and the case reported by Brandt and Mackenzie (1987), and was noted as frequent in those with perinatal OCD experiencing thoughts of infanticide by Button and Reivich (1972).

2.3.2 Previous psychiatric history, personality disorder and perinatal OCD

For those with purely postnatal onset, a previous history of anxiety was reported in 7/15 women by Sichel, Cohen et al. (1993). The remainder had a history of panic attacks and generalised anxiety disorder, none of whom had been treated. Miller (2013) also found an association between obsessive-compulsive symptoms and greater psychiatric history.

In the single study to investigate the association, avoidant and obsessive compulsive personality disorders were associated with PPOCD, although participants were assessed on the day after giving birth using the SCID screener rather than clinician diagnosis. This may have affected results especially as some women in the sample had experienced complicated births and one can assume were recovering from the effects (Uguz, Akman et al. 2007).

Greater rates of reported family history of OCD was linked to postnatal onset OCD in Uguz et al (2007) but not by Forray (2010) who took a stricter definition, limited to diagnosed difficulties only.

2.3.3 Parity, obstetric events and perinatal OCD

Although it can occur after any pregnancy, postpartum OCD seems to be more likely to occur after the first pregnancy (75% in Maina, Albert et al. 2000; Labad, Menchon et al. 2005; Uguz, Akman et al. 2007; Forray, Focseneanu et al. 2010). However, one study found OCD to be more common in multiparous women (Zambaldi, Cantilino

et al. 2009) whilst Uguz, Gezginc et al. (2007) did not find a difference. They also reported no difference between pregnant women with and without OCD in terms of number of gestations, history of abortion or gestational complications.

The Turkish group also examined this by comparing women with postpartum onset OCD with mothers with non-postpartum onset OCD and also found no differences in terms of number of children, planned/unplanned pregnancy, gender of baby, presence of breastfeeding, number of abortions, gestational complications and type of delivery (Uguz, Akman et al. 2007).

Some studies have found no association with obstetric events (Labad, Menchon et al. 2005; Uguz, Akman et al. 2007; Uguz, Gezginc et al. 2007) and the onset of OCD. However, Zambaldi, Cantilino et al. (2009) did find an association between obstetric complications and OCD in their study. High rates of obstetric events were also reported in Maina et al (1999). This study was the only to report that OCD occurred after both wanted pregnancies and unwanted pregnancies (Maina, Albert et al. 1999); other studies did not report or investigate this.

The relevance of obstetric events is difficult to interpret given the varying baseline use of interventions such as emergency caesarians across sites and internationally.

2.3.4 Other reproductive events, biological factors and perinatal OCD

In addition to the evidence on prevalence in the perinatal period, reports of premenstrual worsening of OCD have found some overlap with those women reporting exacerbation in pregnancy (Williams and Koran 1997; Labad, Menchon et al. 2005; Forray, Focseneanu et al. 2010). Compared with women with OCD whose

symptoms did not worsen at this time, those who experience premenstrual worsening of symptoms have been reported to experience higher frequencies of sexual obsessions, depression, anxiety and suicidality (Labad, Menchon et al. 2005; Moreira, Bins et al. 2013).

The associations have led to the proposal that a subgroup of women with OCD are more susceptible to the influence of hormonal changes (Sichel, Cohen et al. 1993; Vulink, Denys et al. 2006). According to this theory, linked to the 'serotonin hypothesis' of OCD, levels of serotonin are influenced by levels of reproductive hormones which then leads to symptom fluctuation. However, the evidence for the role of serotonin in symptom causation is at best sparse (see above Chapter 1.4.3). Oxytocin has also been implicated as a modulating factor as it is linked to bonding (Gordon, Zagoory-Sharon et al. 2010) and differences have been found in people with and without OCD (Leckman, Goodman et al. 1994). However, most women with OCD do not report any association between the menstrual cycle and symptomatology (Labad, Menchon et al. 2005). Given that hormonal changes are clearly important in the perinatal period and have been linked with mood (Steiner, Dunn et al. 2003), it is likely they play some role for some people. Other lines of enquiry may be in perinatal changes in maternal brain anatomy (Kim, Leckman et al. 2010) and genetic markers (Costas, Gratacos et al. 2010). Further work on biological markers in the development of perinatal obsessive compulsive symptomatology is required.

A handful of studies have highlighted relationships between other types of reproductive events and OCD. OCD (and in one case cormorbid compulsive

hoarding) following abortion has been reported in three case studies (Lipper and Feigenbaum 1976; McCraw 1989; Sockalingam and Zemans 2007). However, the cases reported had longstanding obsessional symptoms and the abortion appears to be one of a constellation of events potentially relevant to the onset of OCD. A larger cross-sectional study reported no link (Uguz, Gezginc et al. 2007). To date there has been no large prospective investigation of relationships between OCD and abortion.

Geller, Klier et al. (2001) investigated rates of OCD, panic disorder and phobia in the six months following miscarriage in a sample of 229 women (compared with 230 controls) and found 3.5% experienced 'recurrent obsessional episodes' compared with 0.4% in the control group. No other anxiety disorder diagnosis was linked to miscarriage. Similarly Janssen et al (1996) in a large study following 227 women who lost their babies and 213 women who did not from the same sample, found higher rates of obsessive-compulsive symptoms at six months after pregnancy loss compared with women who delivered. This relationship disappeared with longer follow up at twelve and eighteen months (Janssen, Cuisinier et al. 1996).

Research has indicated that following miscarriage levels of general anxiety are more likely to be elevated than depression, and that subsequent pregnancies can either trigger further anxiety or be restorative (Geller, Kerns et al. 2004). This study takes a dimensional approach to anxiety symptoms and OCD has not been specifically studied with regard to the impact on subsequent pregnancies.

Two women (7.5%) in Buttolph and Holland (1990)'s survey reported infertility as the trigger for their OCD. A further two respondents reported that miscarriage had worsened their OCD, in both cases the women had attributed the event to

obsessions about harming others, and also in one case that she had a venereal disease.

There are no known studies examining the relationship between conception using IVF and OCD although one case study has been described of the development of severe contamination OCD following conception of quadruplets by IVF and abortion of two fetuses on the grounds of safety (Diaz, Grush et al. 1997). However, the particular circumstances may mean this case is atypical.

The notion that biological factors may play a role in the mediation of OCD symptomatology in the perinatal period has led to a focus on the experience of clinically ill women without fully accounting for the experiences of men and the general population. The finding that experiences of rapid onset of OCD remarkably similar to those reported in women can occur in men, albeit less frequently (Buttolph and Holland 1990; Abramowitz, Moore et al. 2001) as well as the finding that obsessional symptoms are experienced by the majority of mothers and fathers, indicate that environmental and psychological factors are likely to play an important role. However, these are as yet poorly understood.

2.3.5 Beliefs and the development of perinatal OCD

Abramowitz et al studied the pathogenesis of OCD in the context of childbirth, examining predictors of symptomatology in a community sample of mothers and fathers (Abramowitz, Khandker et al. 2006). 85 of 100 parents recruited from antenatal classes (acknowledged by the authors as a relatively affluent and perhaps unrepresentative group) completed the study. Participants were assessed at 5

months antenatally for diagnoses and completed measures of psychopathology and the OBQ, a measure of obsessional beliefs. At approximately 3 months postpartum, participants completed the psychopathology measures again and were administered the YBOCS and an assessment of the occurrence and severity of postnatal intrusive thoughts by interview. The study found the majority of participants endorsed intrusive thoughts and neutralising strategies at 3 months postpartum and 20% had YBOCS scores in the mild (7-15) range. Most importantly, the authors found that antenatal total OBQ scores predicted OCD severity on the YBOCS and washing checking and obsessions scores on the OCI-R at 3 months, even when controlling for antenatal obsessive symptomatology. OBQ scores did not predict general anxious or depressive symptoms. This study is therefore consistent with the idea that beliefs are risk factors for rather than merely correlates of obsessional symptoms.

The authors replicated and extended this work in a subsequent study examining whether negative appraisals of intrusive thoughts mediated the relationship between antenatal beliefs and postnatal symptoms. They collected data in a similar sample of 76 mothers and fathers antenatally and at 1 month and 3-4 months postpartum. Participants completed the thought-action fusion (TAF) inventory antenatally as well as the OBQ. At the middle timepoint they collected data about the appraisal of thoughts using the interpretations of intrusions inventory. They found that the TAF subscale indicating belief that thoughts indicate harm could befall another (TAF-Likelihood other) predicted postnatal obsessive-compulsive symptomatology, even after controlling for antenatal symptomatology. Negative

appraisals of unwanted thoughts partially mediated the association between beliefs and symptomatology (Abramowitz, Nelson et al. 2007).

This line of investigation led the same group to examine whether a psychoeducational intervention could prevent the development of symptoms in a sample of first time mothers 'at risk' (defined as a score of 1.5 standard deviations above the mean on the OBQ, a measure of belief domains relevant to OCD). Using a double blind (evaluator and participant) design the participants undertook a traditional antenatal class combined with an add-on session of either general education about anxiety and anxiety disorders (control condition), or a structured programme of detailed cognitive behaviourally orientated psychoeducation about perinatal obsessive-compulsive symptoms, relevant beliefs and how to deal with them (prevention condition).

58/71 completed the 1 month assessment, with 50 and 49 at 3 and 6 months. Depression scores did not differ between groups or change between ante- and postnatal assessments. OBQ scores reduced in the prevention group post-intervention and this change was maintained. Scores slightly increased in the control group. There were no differences in the frequency of postnatal obsessions reported at any postnatal timepoint (using Abramowitz's checklist (2003)). However, mothers in the control group reported mild but clinically significant (>8) mean YBOCS scores at 1 month, 3 months and 6 months postpartum whilst the prevention group mean scores were statistically different and remained in the subclinical range at all three outcome points. The prevention group YBOCS scores decreased from 1 to 6 months postnatal (t-2.77, p=0.01). Using the YBOCS, the

treatment effect size increased from 0.41 at 1 month to 0.68 at 3 months and 0.73 at 6 months. Unfortunately the YBOCS was not administered at baseline, leaving open the possibility that the groups would have differed at that point, although another measure of obsessive-compulsive symptoms did not show a difference (Timpano, Abramowitz et al. 2011).

As a whole, prevalence studies show that the diagnosis of OCD appears to be poorly understood in the perinatal period, but there is some suggestion that it is probably fluid with people moving in and out of the experience of symptoms, sometimes with rapidity (although it is not clear how this compares to non-perinatal OCD).

The emergence (and disappearance) of the disorder at this time is therefore likely to be due to a complex interaction of biological, psychological and sociological factors.

Although work on identifying these factors is in the early stages there is exciting preliminary evidence of malleable psychological risk factors.

2.4 Symptom presentation and perinatal OCD

It is clear that the experience of perinatal OCD is not merely confined to mild and transient symptoms (Sichel, Cohen et al. 1993). The level of symptoms of perinatal OCD is in line with OCD at other times, with a range of severity possible (Maina, Albert et al. 1999).

The rather limited available evidence indicates that obsessions and compulsions tend to orientate round the baby. If true, this is not surprising given the finding that heightened levels of intrusive thoughts have been found following exposure to

specific stressful situations (Wroe, Salkovskis et al. 2000). During pregnancy and postnatally, the context of being or becoming a parent is dominant part of psychological and everyday life, combined with messages about the need to maximize and protect the health and wellbeing of the infant.

2.4.1 Symptom presentation during pregnancy

Chelmow and Halfin (1997) describe a woman with onset of OCD during a previous pregnancy who experienced obsessions about contamination and compulsions related to cleaning and ordering. She discontinued medication when she discovered she was pregnant again and her symptoms worsened through pregnancy until she resumed medication postnatally.

The Turkish group of Uguz, Gezginc et al. (2007) report that contamination (81.3%), symmetry/exactness (50%), aggressive (43.3) and religious (37.5%) were the most common obsessions in their small pregnancy sample (n=16). Common compulsions were cleaning (81.3%), checking (56.3%) and ordering/arranging (43.8). The authors report that 'aggressive obsessions' in 3/7 and contamination/washing symptoms in 3/13 women were related to the foetus. Unfortunately the category of 'aggressive obsessions' included both intentional and accidental harm in this study.

Similarly in another study by the same authors of 15 women identified as having OCD in the third trimester of pregnancy, 80% had contamination obsessions, 60% had symmetry/exactness and the most common compulsions were washing (86.7%) and checking (60%)(Uguz, Gezginc et al. 2007). Both the women who reported onset in pregnancy had 'aggressive obsessions' ('harming the fetus' and 'images of

harming the newborn after childbirth), but given the compulsions of one was described as 'cleaning', it is again unclear whether the thoughts were of intentional or accidental harm. 9/13 women with pre-pregnancy symptoms reported no change in content. 2 reported additional obsessions regarding deliberate harm and 2 additional obsessions regarding contamination.

In summary, contamination obsessions appear to be the most common presentation of OCD in pregnancy, although the two largest studies are from the same Turkish population of almost exclusively married, non working, primary school educated Turkish women which may not be generalisable to other populations.

2.4.2 Symptom presentation during the postpartum period

Studies examining postnatal symptoms have utilised both clinical and non clinical samples. The existing clinical studies are often small scale case studies and series, with larger scale and more robust investigations with non clinical samples. The clinical studies will be considered first.

Sichel, Cohen et al. (1993) identified 15 women with postnatal onset OCD from a retrospective chart review. The women had onset of their difficulties between 2 days and 4 weeks after birth, and all experienced intrusive thoughts of deliberately harming the infant. Although not described in detail, "all women developed some degree of avoidance towards their infant and modified their behaviour and contact with the children in various ways i.e. not bathing the infants, avoiding kitchen knives, or staying physically isolated from them for reasons such as fear of harming the children in their sleep (p.158)." The authors report that none of the women

engaged in any formal compulsions such as rituals, although it may have been hard to determine subtle compulsions from a notes review.

Maina, Albert et al. (1999) found that all women in their study with postpartum onset OCD (n=8) reported aggressive fears of harming the newborn (compared with 54.2% 12/24 of the non postpartum onset group). 6/8 (75%) of their postpartum onset group *also* experienced contamination obsessions and washing compulsions. Arnold (1999) reported on seven cases of postnatal onset OCD recruited via advertisement, who experienced aggressive obsessions towards the infant. 5/7 (71%) also experienced contamination obsessions with a range of other obsessions also reported. 5/7 women reported 'disruptions in the mother-infant relationship' as a result of the disorder. These included avoidance of the infant, difficulty in allowing (older) children to participate in school trips, bringing the (older) child to medical consultations and checking on them by phone, never separating from the infant and refusal to allow anyone (including the partner) to hold them. It is clear that some of these symptoms refer to the broader family rather than the perinatal context alone.

In a larger survey of 90 women with OCD Labad, Alonso et al. (2010) found hoarding onset more likely to be at menarche and those with contamination obsessions were more likely to have onset during pregnancy/postnatal period.

In their study of Turkish women with OCD Uguz, Akman et al. (2007) report that contamination obsessions were the most prevalent (75%) followed by aggressive (33.3%) and symmetry/exactness (33.3). Participants in this study had significantly

more aggressive obsessions than a comparison sample of women with non postpartum onset OCD.

Chaudron and Nirodi (2010) note that symmetry, contamination and obsessions were the most common symptoms in their sample and that the intensity but not the nature of symptoms increased postnatally. Unfortunately no specific data was provided.

Zambaldi, Cantilino et al. (2009) found aggressive obsessions to be reported by 77.8% of women with OCD compared with 27.5% of healthy controls, using the YBOCs checklist. Contamination obsessions occurred with similar frequency in women with OCD (77.8%) and were experienced by 31.9% of the control group. Overall, the researchers found a greater frequency of all types of obsessions and compulsions in the OCD than the control group, although all symptoms were endorsed by a significant proportion of non-OCD participants: Overall, 53.8% endorsed some obsessions and 42.3% endorsed compulsions.

Miller et al (2013) found that contamination fears, fears of making mistakes and harm coming to the infant were the most commonly reported obsessions, whilst washing, checking, mental rituals and ordering/arranging were common compulsions in their early postnatal group.

In those studies that have assessed it, postpartum OCD symptoms are accompanied by good insight (Sichel, Cohen et al. 1993; Uguz, Akman et al. 2007). There have been no reports of women acting on their thoughts and intentionally harming their infants.

The majority of studies report a preponderance of 'aggressive obsessions' in postpartum samples with contamination symptoms also prominent. However, larger studies including cross cultural samples are required.

2.4.3 Intrusive thoughts in the non-clinical perinatal population

As might be expected from the literature on OCD in general, intrusive thoughts are common in new parents. Studies such as Zambaldi, Cantilino et al. (2009) comparing those with and without OCD in the general perinatal population reported high levels of non clinical obsessions (58%) and compulsions (42.3%). Other investigators have examined rates of these symptoms in more detail.

Leckman, Mayes et al. (1999) reported that parental preoccupation with the infant and their safety peaks at 2 weeks postpartum. Following 41 sets of parents, the authors found that >95% reported recurrent thoughts concerning the child's wellbeing which continued for most parents at three months. At this point 37% reported intrusive thoughts of deliberate harm (14 mothers and 16 fathers). These thoughts were generally 'fleeting'.

Abramowitz and colleagues sent 300 surveys to non-clinical mothers and fathers, with 20% completed (92 mothers and 64 fathers) (Abramowitz, Schwartz et al. 2003). 68.8% of mothers and 57.7% of fathers reported the presence of unwanted intrusive thoughts and respondents were asked to list up to three which were explored in terms of duration, distress, interference and controllability. Reported thoughts were organised into seven categories: Sudden infant death syndrome; accidents; unwanted thoughts of intentional harm; losing the infant; illness;

unacceptable sexual thoughts and contamination. The frequency with which they were endorsed is shown below.

	Mothers (53)	**Fathers (23)**	**Total**
SIDS	40 (44.4)	14 (45.2)	54 (44.6)
Accidents	24 (26.7)	8 (25.8)	32 (26.4)
Intentional Harm	19 (21.1)	7 (22.6)	26 (21.5)
Losing baby	7 (7.8)	1 (3.2)	8 (6.6)
Illness	3 (3.3)	0	3 (2.5)
Sexual thoughts	2 (2.2)	0	2 (1.7)
Contamination	0	1 (2.3)	1 (0.8)

Table 5: Endorsement of common obsessions in a nonclinical perinatal population reproduced from Abramowitz et al, (2003).

The thoughts were more frequent and distressing in mothers than fathers, who also reported higher depression (CES-D) scores. Depression scores were moderately correlated with questions about interference (time, distress, controllability) in mothers but not fathers, perhaps reflecting the greater contrast for mothers between unwanted intrusive thoughts and expectations about parenting experience. The sample was selected on the basis of uncomplicated delivery and full-term pregnancy; it is therefore unclear if or how those factors may also contribute to the experience of unwanted intrusive thoughts.

Both groups in the Abramowitz study reported being able to control their thoughts reasonably effectively but 85% of mothers and 86% of fathers deliberately used a particular strategy to do so. The strategies used to 'control' the thoughts included (in order of frequency) self-reassurance, distraction, checking, prayer, interacting with the infant, seeking social support, thought replacement and avoidance (Larsen, Schwartz et al. 2006).

A subsequent study investigated beliefs and thoughts both antenatally and postnatally in the same sample. This found 89.4% of parents (90.7% of mothers and 88.1% of fathers) endorsed having obsessional thoughts with 84.7% using some form of strategy to 'deal with' or neutralise them (Abramowitz, Khandker et al. 2006). This study also found that antenatal obsessional beliefs predicted the severity of symptoms (which were in general subclinical in this sample).

Fairbrother and Woody (2008) conducted a survey on one hundred women antenatally and twice in the early postnatal period at 4 weeks and three months. This study collected data on the characteristics of the thoughts including rating of distress, frequency and interference with parenting, guilt associated and likelihood of the event occurring. Thoughts of accidental harm were nearly universal at both timepoints (100% and 95.2%), with the proportions reporting thoughts of intentional harm being 49.5% and 19.1%. The content of thoughts resembled closely those found in clinical samples (Sichel, Cohen et al. 1993): accidental (suffocation, dropping, contamination, illness) and intentional (screaming at the baby, shaking, hitting, throwing, sexual abuse, stabbing, drowning, smothering). Thoughts of intentional harm were more upsetting than those of accidental harm.

In this healthy sample, at 4 weeks postpartum 7.7% of those with thoughts of accidental harm were considered clinically significant in terms of interference (by combining the component ratings of thought characteristics) compared with 4.4% of those with thoughts of intentional harm. These reduced to 4.4% and 0% at 12 weeks respectively. Parenting stress (the mothers perceived relationship with the infant) and social support predicted which parents reported intentional harm compared with those reporting accidental harm only (although these measures were taken concurrently). The direction of influence is unclear and the occurrence of unwanted thoughts may impact on the mother's perception of her relationship. Child difficultness and mother personality were unrelated. Fairbrother and Woody also examined relationships between intrusive thoughts and self-reported harsh parenting and found that harsh parenting over the first three months was as common in those who did and did not report thoughts of intentional harm at 4 weeks. It was more common (but this finding was not statistically significant) in those reporting thoughts of harm at 3 months. Thought content was not related to the parenting practice in question.

In a recent Spanish study, EPQ psychoticism measured 2-3 days after delivery in a non clinical sample was related to the experience of having intrusive thoughts of harm assessed at 8 weeks by interview during a postnatal health check. 13% of women reported such thoughts which were all transient and non interfering, a relatively low figure which may be due to the face to face assessment method; again the measurement of personality directly after delivery may have led to biased results (Gutiérrez-Zotes, Farnós et al. 2013).

Overall, the evidence from several studies indicates that as with the non-perinatal population, obsessional phenomena are common in the general population of mothers and fathers. The similarities between the patterns experienced by both groups is striking.

2.4.4 Links between perinatal OCD and depression

Given the importance of accurate diagnostic assessment in the management of postnatal disorders, understanding relationships between depression and OCD is of considerable importance. As mentioned, in the nonperinatal population comorbidity between OCD and depression is high, affecting up to a third of all those with OCD (Antony, Downie et al. 1998). This may lead to over-recognition of depression to the exclusion of OCD in the perinatal period (discussed in more detail in chapter 4).

All seven participants with postnatal OCD in Arnold (1999)'s case series were suffering from a concurrent mood disorder (unipolar or bipolar depression). 5/7 were experiencing comorbid anxiety and three women had PTSD related to childhood sexual abuse.

A retrospective study of those with pre-existing OCD found 9 (37%) women reported a postnatal depressive episode, with 5 of the 9 having no prior history of mood disorder (Williams and Koran 1997).

Miller et al's (2013) study found rates of comorbidity with depression of 70-80% (both OCD and depression were determined by exceeding a screening threshold on self report measures). Amongst those with moderate OCD, 33% and 25% had severe

depression at the two timepoints (compared with overall rates of 1.5% and 0.6%), leading the authors to raise the question of whether OCD is a subtype of the postnatal depression spectrum. However, they conclude from the modest correlations between OCD and depression scores (Pearson's r= 0.3) that different concepts were measured. Relatively low rates of comorbidity with anxiety were reported at the two timepoints, 27.5% and 5.7% respectively. Sichel, Cohen et al. (1993) found that nine out of 15 women with postnatal onset OCD developed major depression 2-3 weeks after the onset of their depressive symptoms. Patients 'uniformly identified their intrusive thoughts as the predominant source of distress' illustrating that people are often very clear as to the main source of their difficulties.

Examining rates of OCD in perinatal depression, Wenzel, Gorman et al. (2001) assessed a large community sample (n=766) of women with symptoms of postpartum dysphoria at 4-6 months postpartum, and found a rate of 3.9% of DSM-IV OCD and 14.3% when subclinical OCD symptoms were included. This compares with a comorbidity rate of 14.3% in non postpartum depression (Pini, Cassano et al. 1997). The majority of women reported contamination/cleaning symptoms related to the infant with counting and checking the next most common symptom presentation. None of the participants reported thoughts of intentional harm (although participants may have been reluctant to disclose such thoughts which were assessed by open-ended question rather than a checklist). Information about antenatal or preconception diagnoses is not provided.

Taking a symptomatology perspective, several studies have examined depressive sypmtoms in perinatal OCD and vice versa. Rachman proposed a bi-directional relationship between mood and OCD (Rachman 1997). This is supported by experimental research that has shown that dysphoria can increase the likelihood of obsessions (Reynolds and Salkovskis 1992) and the finding that major depression is associated with obsessions in general samples of people with OCD (Ricciardi and McNally 1995).

Wisner, Peindl et al. (1999) used the YBOCS to compare obsessional symptoms in mothers with postnatal depression and mothers with non postnatal depression. Similar frequency of obsessional symptoms were endorsed in both groups, with postnatally depressed mothers reporting more aggressive obsessions than controls, usually thoughts of harming the infant. Depression severity was not related to the presence of symptoms. The authors comment that symptom intensity did not differ, although no details are reported regarding this or the severity and interference caused. It is not clearly stated that the aggressive obsessions reported were ego-dystonic. The potential similarities and differences in phenomenology of the symptoms between the depression groups remain unclear. Mothers with comorbid clinical OCD were excluded from this study (n not reported) and there was no non-depressed control group, limiting conclusions about the occurrence of such symptoms in general.

In a non clinical study examining intrusive thoughts and depressive symptoms, maternal depression scores (which were mostly in the subclinical range), were

found to moderately correlate with YBOCS time, interference, distress and controllability of intrusive thoughts (Abramowitz, Schwartz et al. 2003).

Abramowitz, Meltzer-Brody et al. (2010) examined obsessive compulsive symptoms in a sample of 52 postnatal women seeking help for mood difficulties. 87% of respondents reported the experience of at least one intrusive thought using the categories provided (derived from Abramowitz 2006). In contrast to previous research, those above the EPDS score of 11 had significantly higher compulsions scores than those below; there were small/moderate correlations between EPDS and obsessions and compulsions scores in the whole sample.

It has long been documented that thoughts of deliberate harm to the infant can occur in both depression and OCD as well as in psychosis (Button and Reivich 1972). A particularly influential but methodologically weak study by (Jennings, Ross et al. 1999) found that 41% of 100 depressed mothers of 0-3 year olds reported thoughts of harming their child, compared with 6.5% in the control group (n=46). However, this paper did not screen for OCD as an additional diagnosis in either group and respondents in the control group were not rated for fears of being alone with the infant and difficulties caring for them which were rated in the depressed group and gave an implicit context to the thoughts of harm. Thoughts of harm were assessed with a single question in which respondents were presented a spectrum of answers from experiencing no thoughts of harm to having actually harmed their child. The phenomenology and response to the thoughts of harm are therefore poorly described in this study. The frequency with which thoughts of harm were reported in the control group (6.5%) is much lower than most studies of intrusive thoughts in

non-clinical postpartum samples (e.g. 49.5% and 19.1% in Fairbrother and Woody 2008), which may be partly explained by the wide child age range which was not strictly postnatal (0-3 years).

Whilst there is clearly some overlap between depressive and obsessive symptoms, it is less clear whether one causes the other or whether they are distinct co-occurring entities.

Aggressive obsessions (thoughts of harm) and contamination symptomatology seem to be the predominant presentations in perinatal OCD.

These symptoms are also common in the non-clinical perinatal population as well as thoughts of accidental harm and illness befalling the infant.

OCD in the perinatal period tends to orientate around the baby and the tasks of childcare, which mirrors and extends the normal phenomenon of parental preoccupation and normal intrusive thoughts of harm in the postnatal period.

The relationships between the diagnoses of OCD and depression as well as the overlap in subclinical symptoms of the two disorders are not yet well understood.

2.6 Impact of perinatal OCD

Few studies have examined the impact of perinatal OCD on the mother in general terms. In one exception, a cross-sectional study of 25 pregnant women found OCD in pregnancy to be associated with deficits in all domains of quality of life as

measured by the WHOQOL compared with a control group matched for demographic characteristics (Gezginc, Uguz et al. 2008). The mean duration of illness was 8 years indicating many women had pre-existing OCD; it is difficult to conclude from the design of this study whether pregnancy had improved or worsened quality of life and whether there were any specific issues of quality of life pertaining to pregnancy.

A further study by this Turkish group found that if left untreated for the postnatal year, the disorder remains at a similar level of severity, so any impact is likely to be ongoing/unfolding with the development of the child (Uguz, Kaya et al. 2008).

Although behaviour likely to interfere with parenting has been reported in several case studies and case series, there are as yet no systematic studies of the impact of OCD on parenting and infants. There are no studies of family accommodation in perinatal OCD or the effect on the wider family system from this problem.

2.7 Perinatal OCD as a subtype

The increasing evidence for an association between OCD and the perinatal period has led to some discussion as to whether OCD at this time represents a 'distinct subtype of OCD' (McGuinness, Blissett et al. 2011) or whether this is simply a time of increased risk for OCD in general. A similar debate has occurred relating to postnatal depression with attention given to recurrence versus *de novo* cases of PND, the latter more influenced by the specific stressors of motherhood than

general psychological vulnerabilities. Such women may be more likely to relapse with subsequent pregnancies, but less likely to relapse overall (Cooper and Murray 1995; Cooper, Jones et al. 2007).

Fairbrother and Abramowitz (2007) suggested that postpartum onset OCD does present a distinct clinical picture, and proposed a model of PPOCD that aims to explain (i) the rapid onset of symptoms, (ii) specificity of symptom presentation, (iii) the presence of symptoms in both mothers and fathers, and (iv) the fact that whilst distressing thoughts are common, few develop the full blown disorder.

The model accounts for the rapid onset of symptoms in the context of a dramatic change in levels of responsibility whilst caring for a 'vulnerable and highly cherished infant'. As described above there is evidence that pregnancy and childbirth are triggering events for OCD in both mothers and fathers (Buttolph and Holland 1990; Maina, Albert et al. 2000; Abramowitz, Moore et al. 2001; Abramowitz, Schwartz et al. 2003), that symptoms orientate around the infant and caregiving and that obsessions and compulsions are found in the general population without becoming clinically significant. However, the general cognitive model accounts for all these factors. Early parental preoccupation with the infant is functional and has been described as essential to the formation of a positive relationship (Winnicott 1958). Leckman and colleagues have proposed that early preoccupation that imitates OCD is adaptive, but OCD is a dysregulation of these normal processes of threat regulation and harm avoidance (Feygin, Swain et al. 2006).

Rather than the phenomenology of the disorder, the primary point of uniqueness of perinatal OCD is the surrounding context, most importantly the fact that it affects at

least two people via the dependence of the infant on the mother and the dominance of caregiving tasks in the mother's life at this time. The details of this are yet to be clearly described.

2.8 Chapter 2 conclusions

- *The evidence shows that anxiety is a significant source of morbidity in the postnatal population;, the prevalence and relative risk of perinatal OCD is still uncertain but it is a significant problem affecting women in the perinatal period.*
- *The risk factors for the development and exacerbation of obsessive-compulsive disorder in the perinatal period are still undefined, even within the population of people with OCD.*
- *Research is focused on the epidemiology of perinatal OCD; little is known about any general or specific sequelae of OCD during pregnancy and the postnatal period. These are likely to include impact on early parenting and children.*

3. Early parenting and anxiety

The previous chapters gave an overview of the prevalence, impact of OCD and factors influencing its development and discussed what is known about perinatal OCD in these terms. This highlighted the evidence that whilst obsessional symptoms are relatively common in new parents, little is known about the characteristics of parenting by mothers with OCD, the extent of influence OCD has on this, or the relevance of their own state of mind regarding attachment.

This chapter will discuss what is known about early parenting and maternal anxiety in terms of the parenting interactions of anxious parents, mother-infant attachment and the influences of experiences of parenting on subsequent anxiety.

Other important contextual variables that may influence parenting such as marital/dyadic relationships, social support and infant temperament will also be considered.

3.1 Influences on and by early parenting

Child development occurs within a dynamic system of interacting variables, of which parenting is prominent. Research has emphasized the importance of three main sources of influence on parenting – the personal psychological resources of the parent, child characteristics and contextual sources of stress and support (Belsky 1984). These influences can reciprocally affect one another.

The postpartum period provides perhaps the most important context for parenting, as at this time the child is most under the direct influence of the parent, and the majority of their emotional and physical needs are directly mediated by parental behaviour over the first year of life. In parallel, the adult's life is dominated by the infant and the continually changing tasks and demands of parenthood, accompanied by both the potential rewards and potential strain that this can present.

Early parenting can be considered from the point of view of mother-infant interactions, attachment, the influence of maternal anxiety and by focusing on other relationship variables such as expressed emotion.

3.2 Mother-infant interactions

Mother-infant interactions comprise a significant part of the infant's first year of life, with initial interactions almost entirely focused on the mother before attention to the outward world and the mother's own attentional focus and reactions begin to play a role in moderating the infant's emotion and behaviour via 'social referencing' .

3.2.1 Maternal sensitivity

Early interactions between mother and infant are thought to provide the basis of the relationship between mother and child, known as the attachment relationship (discussed more fully below). Ainsworth described sensitivity as:

"the mother's ability to perceive and to interpret accurately the signals and communications implicit in her infant's behavior, and given this understanding, to respond to them appropriately and promptly. Thus the mother's sensitivity has four essential components: (a) her awareness of the signals; (b) an accurate interpretation of them; (c) an appropriate response to them; and (d) a prompt response to them."

Sensitivity as operationalised by Ainsworth has been considered the cornerstone of interactions, and she found it to be highly related to attachment (Ainsworth, Blehar et al. 1978). Studies have generally found maternal insensitivity to be linked with subsequent insecure attachment (Egeland and Farber 1984; Isabella and Belsky 1991) although not with the same magnitude of Ainsworth's original finding of r=0.78. However, a meta-analysis of 66 studies did find a significant effect size of 0.22 (k=30, n=1666) (De Wolff and van Ijzendoorn 1997), which slightly increased in strength to 0.24 when the analysis was restricted to studies that closely followed Ainsworth's protocol (k=16, n=837) . De Wolff and van Ijzendoorn (1997) conclude that whilst sensitivity is an important variable, it may be just one of several that ultimately influence attachment.

Researchers have attempted to further refine Ainsworth's definition of sensitive responding. As Bigelow et al write, "behaviors judged to demonstrate maternal sensitivity are diverse, yet they are characterized by socially appropriate and relatively consistent responsiveness to infants' signals and interactions that are within the infants' zone of proximal development. Maternal sensitivity involves mothers' ability to engage with infants at their level and current focus and to

structure interactions to allow infants to achieve levels of development beyond those they could achieve on their own" (Bigelow, MacLean et al. 2010). The concept has been extended to include synchronicity (Isabella and Belsky 1991), contingent vocalisation and joint attention (Bigelow, MacLean et al. 2010) and reflective function (Fonagy, Steele et al. 1991).

Maternal sensitivity has been linked to longer duration of breastfeeding (Tharner, Luijk et al. 2012) and may be linked to physiological and attentional responses to infant distress (Pearson, Lightman et al. 2011; Joosen, Mesman et al. 2013). Situations in which infant distress is elicited therefore may be most pertinent situation to demonstrate sensitivity in early months. Measured later, parental sensitivity to distress has also been linked to better regulation of infant negative affect (Davidov and Grusec 2006).

Sensitivity ratings have been found to have varying stability (Lohaus, Keller et al. 2004). This may partly be explained by the difficulties in measuring sensitivity at different timepoints in infancy. Bigelow, MacLean et al. (2010) found correlations between some but not all measures of aspects of sensitivity (e.g. maternal vocalisations, scaffolding) taken at 4 months, 15 months and 2.5 years that ranged from -0.32 to 0.66. These were measured in slightly different ways at each point and were not all correlated. Behrens, Hart et al. (2012) found consistency between sensitivity (a compoud of contingent responsivity and warmth) measured at home at 10 months and in sensitivity in reunion episodes of the SSP at 12 months measured by Q sort.

Changes in circumstances can compromise maternal sensitivity and changes in sensitivity may have a greater impact on child outcomes than attachment security per se (Belsky and Fearon 2002). Feldman, Greenbaum et al. (1997) found that decreases in maternal trait anxiety as well as changes in infant temperament predicted greater sensitivity in interactions measured from 3 to 9 months. Changes in father involvement also improved maternal sensitivity, intrusiveness and infant exploratory play.

In addition to attachment security, greater maternal senstivity has been associated with a range of positive outcomes including cognitive development (Murray, Fiori-Cowley et al. 1996; Eshere, Daelmans et al, 2006), socio-emotional development (Page, Wilhelm et al. 2010) and self-regulation in infancy (Conradt and Ablow 2010).

Sensitivity is not the only rating of importance as van Ijzendoorn's meta-analysis demonstrates. Furthermore, ratings of home-based interactions may not elicit the most important context of sensitivity; sensitivity may operate maximally in conditions where it is responding to attachment behaviour (Behrens, Parker et al. 2011). Thus the mothers capacity to regulate the infants fear and distress without disrupting the baby may be key to sensitive maternal behaviour. Prediction may be improved by taking ratings in the context of situations where the child requires the mother to regulate signals of threat and comfort.

3.2.2 Maternal cooperation - intrusiveness

Another of Ainsworth's interaction scales was the measure of cooperation-intrusiveness. Ainsworth defined this as:

"the extent to which the mother's interventions and initiations of interaction break into, interrupt or cut cross the baby's ongoing; activity rather than being geared in both timing and quality of the baby's state, mood and current interests."

In several studies high levels of maternal intrusiveness at two to six months has predicted attachment insecurity at twelve months (Bohlin, Hagekull et al. 1989; Isabella and Belsky 1991; Kogan and Carter 1996; Tomlinson, Cooper et al. 2005; Mills-Koonce, Propper et al. 2012). In De Wolff's meta-analysis, the relationship between intrusiveness-cooperation and attachment had an effect size of 0.13 (k=9, n=493) (De Wolff and van Ijzendoorn 1997).

Ainsworth's two other scales (acceptance/rejection and psychological accessibility) have been less frequently used in research and will not be discussed here.

3.2.3 Warmth

Ainsworth found that warmth was not independently related to attachment security (Ainsworth, Blehar et al. 1978), although mothers with securely attached children were found to be more warm in the meta-analysis of (van Ijzendoorn 1995). Maternal warmth may have other functions: maternal non-verbal warmth at 12 months was linked with higher infant development scores at 18 months (Pearson et al, 2011). Ratings of parental warmth have been considered a key part of understanding parenting behaviours with older children and have been found to be linked with regulation of positive affect (Davidov and Grusec 2006) and better general health (Belsky, Bell et al. 2007).

3.2.4 Other concepts in mother-infant interaction

Researchers have also defined related concepts that could be related to the security of the attachment relationship such as mind-mindedness, the ability to correctly recognize and reflect back the infant's mental state (Meins, Fernyhough et al. 2001). A similar concept of insightfulness regarding infant experience was found to be related to attachment and sensitivity and made a unique contribution to attachment in regression analysis (Koren-Karie, Oppenheim et al. 2002).

Other concepts such as joint attention may be important, with one study showing that disorganised infants were less likely to initiate joint attention with a stranger (Claussen, Mundy et al. 2002).

The amount and way parents speak to their children has also been identified as important, as a means of expressing maternal warmth, exhibiting sensitivity and scaffolding interactions (Murray, Kempton et al. 1993; Kaplan, Burgess et al. 2009; Page, Wilhelm et al. 2010). Recently, attention towards infant distress has been described as an important cognitive bias present in healthy individuals from late pregnancy (Pearson, Melotti et al. 2012). Maternal sensitivity (and lower levels of anger and anxiety) to infant distress is also a predictor of later attachment security (Leerkes 2011). Breastfeeding may enhance or maintain this attentional sensitivity postnatally (Pearson, Lightman et al. 2011).

It is as yet unclear how the dimensions of mother-infant interactions translate to subsequent parenting *styles,* usually measured along dimensions of control, protection and care (warmth).

3.3 Attachment

The presence of an attachment system between an infant and its primary caregiver is thought to be a universal phenomenon in humans. Attachment is one of the most widely researched concepts in developmental psychology and it is thought to have a lifelong influence on some areas of social-emotional functioning. Attachment research has highlighted the possibility of the inter-generational transmission of parenting experiences.

John Bowlby first proposed the notion of the attachment behavioural system, which organizes behaviour in order to promote safety seeking in the presence of threat, and to promote exploration once the presence of the caregiver is assured and the situation is no longer threatening (Bowlby 1969/1982). Thus it serves the evolutionary purpose of increasing proximity to the caregiver in times of danger who acts as a 'secure base'. As the child develops, specific behaviours within the system may change, but keep their functional equivalence (i.e. crying may be replaced by crawling towards the parent).

3.3.1 Development of mother-infant attachment

The human attachment system develops within the context of the relationship between the primary caregiver and infant (for brevity hereafter termed the mother-infant relationship). The responses of the mother to the infant's cues are thought to shape their future behavior and expectancies of maternal behaviour. Bowlby, in work subsequently elaborated by Ainsworth, proposed stages in the development of the infant and the attachment system over the first years of life (Bowlby

1969/1982; Ainsworth and Bell 1970). To summarise, in the first stage, soon after birth, babies respond to stimuli in a way likely to increase and continue contact with other humans and to meet their basic needs of nutrition, warmth and safety. Babies preferentially respond to human voices and faces (Kisilevsky, Hains et al. 2009; Cecchini, Baroni et al. 2011). In this early stage, mother-child interactions are frequent and from the perspective of the child, there are (ideally) increasingly predictable outcomes that terminate their attachment behaviour such as being fed or held when crying. If the caregiver responds optimally, stable patterns of interaction begin to become established which minimize the frequency and intensity of attachment signals such as crying and elicit other behaviours such as smiling. Subsequently in the second stage (after about 2-3 months) the infant gains more control over behaviour in a range of ways and also begins to direct attachment and sociable behaviour towards a principal caregiver. In the third phase (beginning from 6-9 months), infants are thought to consolidate attachment to caregivers. Also at this point, the infant is becoming more mobile and able to control proximity to the caregiver and self-directed exploration. Bowlby suggested that as the infant's cognitive ability develops, during this stage infants are able to have an internal concept of an end goal, for example proximity to the caregiver. Therefore the infant is able to operationalise behaviour to reach that goal. Communicative skills are also developed which can be used to request or reject actions and attract attention. A particularly important development is the sociability system and the awareness of strangers. Infants become increasingly wary of unfamiliar humans after the age of six months.

3.3.1.1 Secure and insecure attachment

Repeated patterns of interaction are thought to lead to individual differences in attachment relationships that fall into three basic categories of attachment: Insecure-avoidant (A), secure (B) and insecure anxious/resistant (C) (Ainsworth, Blehar et al. 1978). These patterns have been found to be applicable to infants and related concepts of state of mind regarding attachment have been found in older children and adults (Main, Kaplan et al. 1985). An additional category, disorganized, was added later and is discussed in more detail below.

The terms secure and insecure describe the infant's perception of the availability of the caregiver should the need arise, and the organization of responses to the caregiver in light of that perception of availability. Security implies that the caregiver is perceived as reliably available as a source of protection and comfort (emotional regulation). Secure relationships promote exploration of the environment in the knowledge that the caregiver is ready and able to provide a 'secure base' if necessary and will be sensitive and responsive in their interactions. By contrast insecure infants are thought to have experienced insensitivity or rejection of their bids for attention, or they may have been met with inconsistency and their exploration and use of the attachment figure as a secure base is compromised.

Insecure attachments compromise exploration as the infant cannot do this without some level of worry. Insecure-resistant infants may direct attachment behaviors to the parent in the context of little or no threat in order to continue to elicit caregiving. Insecure-avoidant infants may suppress attachment behaviors even in

conditions of some threat, theoretically to avoid further alienating a rejecting caregiver, or to ensure that the attachment behaviour is effective should the threat increase further (Main and Hesse 1990). Differential styles of attachment therefore may be an adaptive response to the capacities of the caregiver.

Attachment is not thought to be a genetic phenomenon in itself (Bokhorst, Bakermans-Kranenburg et al. 2003). However, there is general support for the notion of differential susceptibility, the idea that some children are genetically more susceptible to the influence of positive or negative environmental factors. In this case that is to say genetics could increase either risk or resilience to non optimal maternal behaviour and may influence the associated type of insecure attachment (Bakermans-Kranenburg and van Ijzendoorn 2007; Belsky, Bakermans-Kranenburg et al. 2007; Raby, Cicchetti et al. 2012).

3.3.1.2 Disorganised attachment

Several researchers using Ainsworth's categories noted that a significant but small proportion of infants did not fit easily into the ABC system. The category of 'Disorganised/disorientated' attachment was developed as an additional super-ordinate code following detailed review of strange situation tapes that were unclassifiable under the ABC system (Main and Solomon 1986). They found that rather than fitting into coherent alternative categories, these infants displayed "bouts or sequences of behaviour that seemed to lack a readily observable goal, intention or explanation." These behaviours included 'disordering of expected temporal sequences (for example a bright greeting followed by avoidance of the parent); simultaneous contradictory behaviour patterns (e.g. approaching the

parent with head averted); incomplete or undirected movements and expressions, including stereotypies; direct indices of confusion or apprehension; and behavioural stilling. Mutual inhibition of the attachment and exploratory systems may cause the disorganisation as attempts to inhibit attachment behaviour are unsuccessful or only partially successful.

Disorganisation was found in 10-12.5% of 'middle class stable samples' on which the strange situation procedure (SSP) was originally used (Main and Solomon 1986).

The presence of infant disorganisation has been linked to unresolved loss in insecure mothers and frightening behaviour in secure and insecure mothers (Schuengel, Bakermans-Kranenburg et al. 1999). 'Disconnected' maternal behaviour has been linked to disorganisation (Out, Bakermans-Kranenburg et al. 2009). Infant disorganisation at twelve months has also been associated with antenatal depression, if mother-infant interactions are suboptimal at three months (Hayes, Goodman et al. 2013).

3.3.2 Measurement of attachment in infancy: the strange situation procedure

Mary Ainsworth developed a standardised test to measure Bowlby's description of the attachment behavioural system known as the strange situation procedure (SSP; Ainsworth, Blehar et al. 1978). Designed to be used with infants of between 12 and 18 months, this procedure consists of a sequence of brief separations and reunions designed to act as a mild stressor for the infant and activate the attachment system

as well as assess the balance between the attachment and exploratory systems (described in full in the methodology section of this thesis). The stress is caused due to the unfamiliar 'lab' setting, the presence of an unfamiliar stranger and two brief separations from the mother.

Broadly speaking, secure (B) infants are able to use the caregiver as a secure base and can explore the room and the toys in their presence. They may or may not be distressed upon separation but upon reunion they will seek proximity or interaction with the caregiver. They will clearly prefer the caregiver to the stranger. After a display of attachment behaviour, which can vary from a brief greeting to indicating a desire for physical proximity, the secure infant is comforted and returns to exploration.

Those classified as avoidant (A) show little affective sharing in the presence of the caregiver and appear to minimize displays of attachment behaviour in the reunion episodes. Typically they do not show distress at separation and if so are comforted by the presence of the stranger. Such infants turn away from the parent at the point of reunion for example in an 'organised shift of attention' (Main and Weston 1982).

Those categorized as anxious/ambivalent (C) are not able to use their parent as a secure base to explore the environment. Instead they maximize displays of attachment behaviour. They are usually distressed by separation but these infants display anger and resistance towards the caregiver on reunion and approach, or are not comforted by the presence of the caregiver throughout the reunion episode.

In non-clinical samples a meta-analysis of 32 studies from various cultures found approximately 21% are considered avoidant, 65% secure and 14% anxious/resistant. Considerable within and between culture variation was also noted (Van Ijzendoorn and Kroonenberg 1988).

3.3.2.1 Reliability of the SSP

Inter-rater reliability for coding of the SSP is very high (80-88%) amongst trained raters (Lyons-Ruth, Repacholi et al. 1991; Carlson 1998). The test-retest stability was tested by Ainsworth over the short-term who found low stability, attributable to the infant's memory of the previous testing procedure. Testing six months apart a large study found that the secure category was stable in 74% of cases, 45% of avoidant infants remained avoidant, and 37% of the resistant category remained resistant representing both significant stability but also notable change (Egeland and Farber 1984).

3.3.2.2 Stability of attachment in infancy and childhood

Evidence of continuity in attachment categories over long periods of time is mixed, ranging from 0 to 70% (e.g. Main and Cassidy 1988; Belsky, Campbell et al. 1996). The variability inherent in using various forms of measurement is likely to explain some of the discontinuity, and researchers have also emphasised the importance of social-contextual variables (Belsky and Fearon 2002). For example, data from the NICHD longitudinal study indicated that insecurely attached children (at 15 months) who experienced sensitive mothering (measured at 24 months) outperformed secure children exposed to insensitive mothering at four years on a range of

developmental outcomes, indicating the importance of ongoing sensitivity (Belsky and Fearon 2002). Continuity may be greater in non-clinical than clinical groups (Weinfield, Whaley et al. 2004).

3.3.2.3 Validity of attachment in infancy

In terms of validity, Ainsworth and colleagues conducted extensive field research to support the construct of differential categories of attachment resulting from mother-infant interactions. She observed mothers interacting with their infants at home for an average of 200 hours each, making notes on infant and maternal behaviour (Ainsworth et al. 1993). These detailed observations of 26 mother-infants dyads over the first year of life provided the basis for the ratings of sensitivity, acceptance (vs rejection), cooperation (vs interference) and psychological accessibility. Mothers of secure infants were high on all four dimensions. Mothers of avoidant infants provided little enjoyable physical proximity whilst mothers of ambivalent infants were inconsistent or unresponsive to distress (Ainsworth and Bell 1970). The differences between insecure subgroups may be less well differentiated than those between insecure and secure groups (Vaughn and Waters 1990).

There has been some discrepancy in SSP categories cross-culturally, particularly in terms of the distribution of insecure categories (Sagi, Van Ijzendoorn et al. 1991).

Attachment is specific to a particular caregiver (Notaro and Volling 1999; Diener, Mengelsdorf et al. 2002). For example, disorganised infants are unlikely to be

classified as disorganized with their second parent or alternative caregiver (Main and Solomon 1986; van Ijzendoorn, Schuengel et al. 1999).

Infant temperament has been found to be a distinct construct from attachment security although it has been found to predict certain behaviours in the strange situation (Egeland and Farber 1984; Belsky and Rovine 1990; Seifer, Schiller et al. 1996). Similarly, attachment disorganization is not related to constitutional or temperamental traits of the infant (Carlson 1998; van Ijzendoorn, Schuengel et al. 1999). Attachment has been found to be related to shared and non-shared environmental influence with a negligible genetic contribution (Bokhorst, Bakermans-Kranenburg et al. 2003; Roisman and Fraley 2008) .

3.3.2.4 Measurement of attachment after infancy

After infancy the measurement of attachment must be adapted from direct observation of behaviours when the attachment system is stressed, to representations of attachment state of mind. This change necessitates caution in interpreting measures of attachment constructs as identical to attachment categorizations derived from the SSP. A range of instruments have been developed to measure attachment in childhood and adulthood. Main, Kaplan et al. (1985) observed that children's coherence in narratives of attachment scenarios related to their attachment classifications in infancy. Subseqent researchers have developed childhood interviews such as the Child Attachment Interview (Target, Fonagy et al. 2003), projective methodology such as the Separation Anxiety Test (Klagsbrun and Bowlby 1976) and doll play methodology in order to assess children's

representations of separation from their mothers. These will not be described in detail here.

In research studies with adults a variety of methods are commonly used to assess state of mind with regard to attachment. The Adult Attachment Interview (AAI) is a researcher rated instrument evaluating the content and coherence of the adult's narrative of their early caregiving history. It yields a measure of current state of mind with regard to attachment, "the security of the self in relation to attachment in its generality rather than in relation to any particular present or past relationship" (Main, Kaplan & Cassidy, 1985 p.78). It has been considered the gold standard of attachment measures in adulthood and requires training to a high standard of reliability in order to use (George, Kaplan et al. 1986). It is a semi-structured interview concerning memories of caregiving experiences and current perceptions of attachment relationships. Based on detailed coding of content and narrative coherence, the AAI yields categories involving similar strategies to the SSP, autonomous / secure, and two insecure categories of dismissing and preoccupied. A further category of unresolved was subsequently developed which has links to the infant category of disorganisation in that respondents report attachment related trauma of loss and/or abuse and manifest confusion/disorganisation in discussing that topic.

A large recent meta-analysis of AAI studies found that in non clinical groups 58% are autonomous (corresponding to secure), 23% dismissing and 19% preoccupied. This changed to 56% considered secure 16% dismissing, 9% preoccupied and 18% considered unresolved when a four category system was used (Bakermans-

Kranenburg and van Ijzendoorn 2009). Examining clinical samples (where either the mother or the child had clinically significant difficulties), the proportions of insecurely attached adults was much higher (37% dismissing, 27% secure, 37% preoccupied), with the (23% dismissing, 21% secure, 13% preoccupied), unresolved group particularly overrepresented at about 43% (van Ijzendoorn and Bakermans-Kranenburg 1996). They did not find gender differences in the use of dismissing versus preoccupied attachment strategies, and the AAI distributions were largely independent of language and country of origin (Bakermans-Kranenburg and van Ijzendoorn 2009).

Given the resource intensive requirements in administration and coding of the AAI, researchers have developed shorter self-report methods to assess attachment related concepts in adulthood, such as shorter attachment related descriptive paragraphs (Bartholomew and Horowitz 1991). They developed four categories of attachment by exploring a person's self-image (positive or negative) and their image of others (positive or negative) to propose the following adult attachment styles: secure (positive model of self, positive model of other), dismissing (positive model of self, negative model of other), preoccupied (negative model of self, positive model of other) and fearful (negative model of self, negative model of other). The PAAQ (Lichtenstein 1991) is a questionnaire measure designed to assess both history of attachment experiences and current state of mind with regard to attachment relationships, yielding several subscales.

Other measures have taken romantic relationships to be a proxy or extension of attachment concepts, such as the Experiences in Close Relationships Scale (ECR,

(Brennan, Clark et al. 1998) These yield subscales of attachment anxiety and attachment avoidance rather than categories.

3.3.3 Longitudinal studies of attachment

Bowlby hypothesised that infant's expectations of the caregiver were internalised, becoming an 'internal working model' (IWM). The IWM then acts as a filter for subsequent experience. As Ainsworth put it, *"Attachment is manifested through [specific] patterns of behavior, but the patterns themselves do not constitute the attachment. Attachment is internal .... this internalized something that we call attachment has aspects of feelings, memories, wishes, expectancies, and intentions, all of which... serves as a kind of filter for the reception and interpretation of interpersonal experience and as a kind of template shaping the nature of outwardly observable response [Ainsworth 1967, p. 429].*" Thus attachment would continue to serve later emotional and behavioural adaptation, with a concomitant model of self-efficacy to match that of the caregiver's responsiveness, i.e. confidence in the ability to elicit the behaviours needed for security.

A number of large scale studies initiated in the 1970s have been able to show light on the predictive power of mother infant attachment in childhood and adulthood for a range of positive and negative outcomes. Sroufe and colleagues have been clear to emphasise that early insecure attachment is not itself psychopathology or a direct cause of psychopathology, but is "an initiator of pathways probabilistically associated with later pathology" (Sroufe, Carlson et al. 1999).

3.3.3.1 Maternal attachment and associations with sensitivity and infant attachment

High levels of concordance have been found between parents AAI classifications and their infant's SSP classification, particularly for the secure category (78-85% (Ward and Carlson 1995; Madigan, Bakermans-Kranenburg et al. 2006). In a meta-analysis of concordance between AAI and SSP categories, van Ijzendoorn (1995) found autonomous/secure categories corresponded in 75% of cases. The association has held even when measured antenatally (Fonagy, Steele et al. 1991; Ward and Carlson 1995) and mothers' attachment representations of their unborn child have also been found to predict subsequent attachment (Benoit, Parker et al. 1997).

Parents' insecure representations of attachment are associated with lower parental sensitivity and insecure infant-parent attachment relationships, leading to less optimal conditions for the children's socio-emotional development. In an analysis of 10 studies involving 389 pairs which tested the relationship between maternal attachment representations and sensitive responding, the effect size was 0.72 (van Ijzendoorn 1995).

Other concepts may have also shown an association with parental attachment status: Arnott and Meins (2007) found autonomous parents as classified on the AAI were associated with greater mind-mindedness. Strathearn, Fonagy et al. (2009) found that secure mothers had greater activation of reward responses (associated with oxytocin) and greater oxytocin levels in interactions at 7m.

Main (2005) suggests that parents with insecure attachment may seek to maintain a state of false but felt security with regard to their own attachment figures'. She hypothesises that infant attachment or exploratory behaviour may disrupt the state of mind that felt optimal for proximity to their own attachment figure in childhood. Insensitive behaviour may therefore be seen as maintaining the parent's model of attachment.

3.3.3.2 Attachment and outcomes in childhood

The evidence is clear that secure attachment in infancy is related to a variety of outcomes relating to more optimal functioning in childhood. It has been associated with, for example, greater self-confidence (Verschueren, Marcoen et al. 1996; Sroufe 2005), language abilities (Belsky and Fearon 2002), social competence (Bohlin, Hagekull et al. 2000), emotional understanding at school age (De Rosnay and Harris 2002) and accuracy in recall of positive memories (Belsky, Spritz et al. 1996).

Conversely, insecure attachment has been implicated as a risk factor for childhood difficulties and psychopathology. Children with insecure attachment exhibit less ability for self-regulation and less self-positivity (Verschueren, Marcoen et al. 1996) and more internalizing and externalizing problems (Muris, Meesters et al. 2003; Brown and Whiteside 2008) . Both attachment style and parenting style have been found to make unique contributions to child anxiety (Brown and Whiteside 2008).

Insecure resistant children were found to have greater levels of sleep problems than insecure avoidant children in a sample of 342 children leading the authors to

suggest a particular role for sleep in terms of emotion regulation within the mother-infant relationship (McNamara, Belsky et al. 2003).

Early studies found a specific relationship between anxious-resistant attachment and anxiety disorders (Warren, Huston et al. 1997). Two recent meta-analyses have produced conflicting results with one finding the association between anxious-resistant attachment whilst the other found a greater association with avoidant attachment and internalizing pathology in childhood (Colonnesi, Draijer et al. 2011; Groh, Roisman et al. 2012). Groh et al found a larger association between insecurity and disorganization and externalizing pathology (Groh, Roisman et al. 2012). With the exception of disorganization, there appears to be little strong evidence that particular categories of insecure attachment may confer more risk than others (Brumariu and Kerns 2010).

Disorganised infants have been found to have more behavioural problems in childhood (Carlson 1998; Pauli-Pott, Haverkock et al. 2007). Main and Cassidy (1988) found that at 6 years, disorganised children were controlling or parental towards their own parents, showing behaviour that was either punitive or caregiving.

Disorganised children are at elevated risk for the later development of psychopathology, even relative to other insecurely attached infants (van Ijzendoorn, Schuengel et al. 1999; Kochanska 2001). Meta-analytic findings support an association between disorganized attachment in infancy and externalizing behaviour problems in childhood although the effect is moderate (r=0.29) (van Ijzendoorn, Schuengel et al. 1999; Groh, Roisman et al. 2012). In addition,

disorganized attachment assessed in infancy has been associated with higher levels of anger at 33 months (Kochanska, 2001), more internalizing problems (Carlson 1998), poorer peer interactions (Jacobvitz & Hazan, 1999), and higher rates of psychopathology in adolescence (Carlson 1998). Disorganisation is more common in clinical samples and the children of mothers with clinical levels of difficulty, and appears to be moderately stable across infancy and childhood (van Ijzendoorn, Schuengel et al. 1999). Whilst disorganisation is an important indicator of risk it is not deterministic.

As time progresses, proximal contextual variables become increasingly important predictors, supplementing the role of mother-infant attachment in child outcomes. It may be that secure or insecure attachment continues to play a role in that it has a moderating effect on other environmental variables. Secure attachment may make the infant more receptive to the influence of parenting (Kochanska, Aksan et al. 2004; Sroufe 2005) and insecure attachment has been more associated with contextual risk (Belsky and Fearon 2002). The influence of attachment may therefore be transformed as well as sustained by subsequent care.

3.3.3.3 Attachment and psychopathology in adults

According to Bowlby the attachment system is an innate way to regulate affect and protect the individual from threat. The successful accomplishment of this regulation gives the individual a sense of attachment security, that is, that the world is a safe place, they can rely on protective others and that they can safely explore (Bowlby 1969/1982). Bowlby theorised that attachment representations (internal working models) are thought to influence views and expectations of the world, the self and

others throughout the individuals lifetime (Hazan and Shaver 1994). Studies of secure attachment styles or representations show they are associated with better functioning and resilience to difficulties (Sroufe 2005; Van Ryzin, Carlson et al. 2011).

Coming from a quite different perspective, Beck outlined the notion that cognitive-affective structures, i.e. the cognitive triad of views about the self, the world and others, could influence a person's susceptibility to psychopathology (Beck, 1976).

There is general evidence in support of this. Attachment anxiety has been associated with relevant concepts such as threat processing (Ein-Dor, Mikulincer et al. 2011) and excessive reassurance seeking in relationships (Shaver, Schachner et al. 2005).

As mentioned above, clinical studies using the AAI indicate much higher rates of concurrently measured insecure and unresolved attachment representations than the non clinical comparison groups. In clinical samples 27% (using the three category system) or 13% (using the four category system including unresolved) are rated as secure in comparison with 58% or 56% (including unresolved) in non clinical samples (Bakermans-Kranenburg and van Ijzendoorn 2009). In a large meta-analysis of AAI data, disorders with an internalizing dimension (e.g. borderline personality disorders) were associated with more preoccupied and unresolved attachments, whereas disorders with an externalizing dimension (e.g. antisocial personality disorders) displayed more dismissing as well as preoccupied attachments (Bakermans-Kranenburg and van Ijzendoorn 2009). Insecure attachment affects strengths as well as clinical difficulties. For example, in a cross

sectional community sample, Karreman and Vingerhoets (2012) found self-reported preoccupied attachment style to be related to poorer outcomes, with higher levels of wellbeing reported in those with dismissing or secure attachments.

Retrospectively reported insecure ambivalent attachment in childhood has been linked with agoraphobia and other anxiety problems in adulthood, although this association is not specific (de Ruiter and Van Ijzendoorn 1992). Rates of insecure attachment in adults with anxiety disorders appears to be high: Manassis, Bradley et al. (1994) found that all of the 18 mothers with anxiety disorders in their sample were classified as insecure, and 14 were classified as unresolved.

A few studies have considered how insecure attachment may influence current anxious psychopathology. Insecure attachment in anxiety disorders has been linked with the processing of general threat information in an emotional stroop task (Van Emmichoven, Van Ijzendoorn et al. 2003). This was further supported by a study that found stressful events mediated the link between insecure attachment and psychopathology, suggesting that fearful attachment style (based on Bartholomew and Horowitz's attachment paragraphs) leads individuals to perceive events as more stressful (Pielage, Gerlsma et al. 2000).

In an interesting study linking the phenomenology of preoccupied attachment with that of clinical worry, Cassidy, Lichtenstein-Phelps et al. (2009) found that people with generalised anxiety disorder (GAD) reported experiencing less maternal love, more rejection/neglect and more role reversal/enmeshment as children than controls. People with GAD reported more current vulnerability with regard to attachment relationships and less memory of early attachment experience. They

were able to predict diagnostic status from elevated scores on their attachment measure, the PAAQ (perceptions of adult attachment questionnaire). Whilst this is not the gold standard of attachment measures (which is the AAI), unlike other self-report measures it yields scales relating to *current* state of mind regarding attachment to a primary caregiver.

Attachment is a key process in understanding child development, although attachment classifications only explain some of the variance in later outcomes.

Maternal sensitivity in interactions is a moderate predictor of attachment; other parenting variables such as mind-mindedness are likely to be directly or indirectly related.

Attachment is measured in infancy using the SSP; measures of attachment in adulthood are likely to measure different but related constructs such as attachment state of mind or felt security in relationships.

Mother-infant attachment has not been studied in the context of perinatal OCD but the high levels of disturbance associated with the disorder may interfere with maternal sensitivity and the formation of secure attachment.

3.5 Maternal anxiety and parenting

Given the growing evidence of the high prevalence of several psychiatric disorders in the postnatal period (see below), research attention has been given to characterising interactions between mothers with specific disorders and their infants, not least because, as described above, this may influence the development

of later emotional problems as the infants grow up. Compromised mother-infant interactions have been identified in a number of different disorders. Mothers with postnatal depression show lower sensitivity in the form of disengagement and/or intrusiveness (Cohn, Matias et al. 1986; Murray, Fiori-Cowley et al. 1996; Hart, Field et al. 1998; Reck, Hunt et al. 2004). The speech of postnatally depressed women to their infants expressed more negative affect, was less focused on infant experience, and tended to show less acknowledgment of infant agency (Murray, Kempton et al. 1993). It has been observed that such difficulties in interaction can persist even after remission of the maternal disorder (Stein, Gath et al. 1991). These observations are important as they may help elucidate mechanisms that link maternal disorder with subsequent outcomes. For example, postnatal depression to insecure attachment in infancy (Murray and Cooper 1997), compromised socio-emotional development (Murray, Sinclair et al. 1999), intellectual development (Hay, Pawlby et al. 2001) and psychopathology in childhood and adolescence (Pawlby, Sharp et al. 2008).

For mothers with eating disorders, controlling behaviour at mealtimes (Stein, Woolley et al. 2001), mealtime conflict (Stein, Woolley et al. 1999) and intrusive behaviour at mealtimes and in play (Stein, Woolley et al. 1994) has been observed.

Many mothers with severe mental illnesses such as schizophrenia and other forms of psychoses often exhibit less sensitive and more intrusive interactions with infants (Steadman, Pawlby et al. 2007). However, it should be remembered that for mothers with all psychiatric disorders a range of interactional functioning is present, even for mothers with psychosis (Pawlby, Fernyhough et al. 2010).

3.5.1 Maternal anxiety and mother-child interactions with older children

Research examining parenting of older children has identified 'anxious' parenting as characterised by low warmth, high control, criticism and low granting of psychological autonomy (Wood, McLeod et al. 2003; Bogels and Brechman-Toussaint 2006; Challacombe and Salkovskis 2009). Such parenting practices have been related to child internalizing difficulties (Bayer, Sanson et al. 2006).

Detailed work has identified the bi-directional nature of such interactions (Moore, Whaley et al. 2004; Eley, Napolitano et al. 2010; Schrock and Woodruff-Borden 2010; Williams, Kertz et al. 2012), indicating that child anxiety can interact with parental anxiety to produce effects which may then be mirrored by the child. The difference can hold even within families; parents of anxious children interact in a more critical way with them than with non-anxious siblings and compared with controls (Lindhout, Markus et al. 2006). As Nicol-Harper et al (2007) point out, characterizing early interactions between mothers and infants has the benefit of minimizing the contribution of child anxiety, although the contribution of child temperament to interactions is an important consideration (see below).

The effects of anxiety on parenting may be more subtle than outwardly expressed behavioural style: anxious parents may not overtly restrict their children more than controls but can experience more anxiety during their child's exploratory behaviour (Turner, Beidel et al. 2003). In line with this, healthy children of parents with panic disorder did not perceive their parents to be more controlling or less caring than

controls (Koszycki, Bilodeau et al. 2013). Parental experiences and perceptions of interactions with younger children and infants have rarely been investigated in this way.

The presence of maternal anxiety disorder indicates a poorer treatment outcome for anxious children. Further, treatment of the maternal anxiety disorder did not improve outcomes for child anxiety, and children did worse where their mother exhibited overinvolved behavior and expressed fear to the child (Creswell, Willetts et al. 2008).

3.5.2 Maternal anxiety and mother-infant interactions

A small number of studies have examined mother infant interactions in mothers with high levels of anxiety and clinical anxiety disorders. Warren, Gunnar et al. (2003) rated observed interactions in a group of 27 infants of mothers with panic disorder and healthy controls using Ainsworth scales of sensitivity and cooperation and also used a Q-sort procedure to assess sensitivity. They found high correlations between all three measures (r=0.84 to 0.92) and therefore utilised the mean of the standardised scores. Mothers with panic differed from controls in ratings of sensitivity during everyday parenting interactions (play, feed, nappy change and bathing) at 8 months. At 15 months mothers with panic disorder reported showing more anger towards their child in response to behaviours but unfortunately observational measures were not taken at this point.

They also found differences in sleep and related parenting variables at 14m with more mothers with panic disorder co-sleeping with infants and greater number of

night wakings in these children. There was significant comorbidity in the panic group with 64% of mothers exhibiting at least one other diagnosis, meaning that the contribution of other disorders to the results cannot be ruled out (Warren, Gunnar et al. 2003).

Weinberg and Tronick (1998) observed interactions in a mixed sample of mothers with major depressive disorder (n=13), panic disorder (n=11) or OCD (n=6) and healthy controls. The authors report that mothers in the clinical groups were more disengaged in interactions than controls, the infants showed more negative affect in interactions with the mother and a stranger. However, despite having diagnoses, self report of psychiatric symptoms only showed a difference between the clinical and control groups in self-reported anxiety, bringing into question the validity of the diagnoses reported in this study. Results are presented discursively throughout, preventing independent interpretation of the data.

Nicol-Harper, Harvey et al. (2007) examined interactions in a group of 64 non-clinical mothers categorised as high or moderate-low trait anxiety on the basis of scores on the Speilberger State-Trait Anxiety Inventory (STAI). They were observed in structured play interactions with infants at 10-14 months postpartum. Differences between the groups were found in terms of maternal sensitive responsivity (a composite variable of sensitivity and facilitation), maternal emotional tone and non-contingent utterances. A subgroup of high trait anxious /low depression mothers were compared with the low trait anxious mothers to examine the contribution of depression which produced a similar pattern of results, suggesting that anxiety was accountable for the differences. No rating of child

temperament was taken but infants did not differ in emotional tone in the interactions.

Feldman, Granat et al. (2009) compared mothers with anxiety disorders, depression and controls. Mothers with depression were the least sensitive and their infants showed most negative emotionality, although mothers with anxiety disorders also differed from controls on these variables. Mothers with anxiety were more intrusive than the other groups. Infant cortisol reactivity was elevated in both clinical groups. Unfortunately they did not assess depressive and anxious symptoms dimensionally so the contribution of these symptoms to interactions and infant variables across groups remains unclear. Kaitz, Maytal et al. (2010) assessed mother infant interactions in anxiety disordered mothers at 6m in detail and excluded women with depression to discern any atypical reactions in 'clean' anxiety sample (but comprising mixed diagnoses). No differences were observed in maternal sensitivity or intrusiveness but the researchers found infants of anxious mothers showed less negative affect in 'stressful situations' (i.e. when the mother stopped interacting in the still face paradigm and during interactions with a researcher).

Other studies have not found globally compromised sensitivity in interactions for mothers with clinical anxiety, but have found disorder-specific differences in relevant situations. Murray and colleagues in an important study demonstrated that if maternal anxiety was elicited by a disorder specific paradigm, in this case social phobia by interaction with a stranger, maternal behavior became less sensitive, and mothers encouraged less interaction with the stranger than controls. The effect was not observed in mothers with GAD (Murray, Cooper et al. 2007).

Interestingly the disorder specific effects did not appear to persist into childhood: a further study examining interactions in the same groups (social phobia, GAD and controls) when the children were 4.9 showed no differences in parenting in a general task and differences between both anxious groups and controls in a speech task. In this study, Murray and colleagues did not find any effect of child characteristics in the expression of maternal anxiety, nor any maternal disorder-specific behaviours (Murray, Lau et al. 2012).

Stein, Craske et al. (2012) examined parenting interactions in a large sample of mothers with clinical anxiety disorders, and manipulated the intensity of symptoms during mother-infant interactions using priming. Mothers (N = 253: GAD n = 90; MDD n = 57; control n = 106) and their infants were randomized to either a worry/rumination prime (WRP) or a neutral prime (NP) and mother-infant interactions were assessed before and after priming. Type of priming was a significant predictor of maternal cognitions, with WRP resulting in more negative thoughts, higher thought recurrence and more self-focus relative to NP across the entire sample. Interaction effects between group and priming were significant for two parenting variables: Compared with controls, the worry prime had a more negative impact on maternal responsiveness to infant vocalization for GAD, and to a lesser extent for depression; the worry prime led to decreased maternal vocalization for GAD. Also, mothers with GAD used stronger control in interactions after the neutral prime than the worry prime, as well as compared with other groups. Finally overall post-priming, their children exhibited lower emotional tone

and more withdrawal. Across the entire sample, the worry prime was associated with increased child vocalization relative to the neutral prime.

This study is particularly important because it demonstrates the possibility of causal mechanisms and begins to answer the question of *why* maternal sensitivity may be compromised for anxious mothers, particularly when symptoms of the maternal disorder are elicited. Stein, Lehtonen et al. (2009) propose that maternal preoccupation may be mechanism of interference in optimal interactions, reducing the mother's attention and responsivity to the environment.

3.5.3 Maternal anxiety and mother-infant attachment

Parental sensitivity in interactions has also been linked to child attachment in older children in samples of mothers with anxiety disorders (Kertz, Smith et al. 2008) and high trait anxiety (Stevenson-Hinde, Chicot et al. 2013). However, few studies have examined the rates of insecure attachment in the infants of mothers with anxiety disorders. Warren, Gunnar et al. (2003) found no difference in the distribution of attachment classifications between children of mothers with panic disorder (n=27) and controls and the distribution closely mirrored findings from non-clinical samples with approximately 60% being securely attached. However, in a study with contrasting results Manassis, Bradley et al. (1994) found that 16/20 (80%) infants of 18 women with anxiety disorders were insecurely attached. The sample primarily consisted of women with panic disorder (14), two of whom had concurrent OCD, a further three women with GAD and one with OCD. 13 of the infants were rated as disorganized, 2 avoidant, 4 secure and 1 ambivalent. The children ranged from 18-

59 months in this study, and as they were outside the age range for the SSP, two parallel coding systems were utilized to assess child attachment in the SSP. The Ainsworth coding was used up to 23 months, which is unusual and the unpublished Cassidy and Marvin preschool system used from 24-59 months. Mothers attachment status was also assessed using the AAI: all of the mothers were rated as insecure, with 14/18 rated as unresolved with respect to trauma. 7/18 women in the sample had experienced sexual abuse. The concordance between child and adult categories was 65%.

These two conflicting studies show that more research with clinically anxious mothers is required. In particular in the present context, there are no studies of mother-infant attachment in samples purely consisting of mothers with OCD.

3.5.4 Modelling and the transmission of psychopathology

Another potentially important concept in mother-infant relations and anxiety is that of modeling, particularly as it may be another mechanism whereby maternal psychopathology may be transmitted to offspring, in contrast with purely biological accounts. Although it is difficult to assess the true extent of parental modeling in a naturalistic setting, several authors have shown that it may be a potentially powerful mechanism of transmission of fears. Social referencing, the examination of others reactions to determine one's own, is an important part of information gathering particularly in infancy. Both verbal and visual information from mothers and strangers has been shown to be important in influencing infants' reactions to novelty (Stenberg and Hagekull 2007; Kim, Walden et al. 2010). In a manipulation of

infant fear responses, Gerull and Rapee (2002) demonstrated that where mothers had paired a stimulus with a fearful expression, infants of 15-20 months showed more subsequent fearfulness and avoidance to that object. A greater effect was found in girls. The same group also demonstrated that positive modeling by mothers could have a protective effect against fear responses, when an object was subsequently presented to the infant (12-20 months) by an examiner showing fear and disgust (Egliston and Rapee 2007).

This appears to be true in clinical groups. Not only the amount of anxiety experienced, but the amount of anxiety exhibited by parents may be important in the transmission of anxiety. Muris, Steerneman et al. (1996) investigated relationships in a group of children referred for various anxiety problems and their parents. They evaluated anxious and depressive symptoms in parents and children asked parents to say to what extent they expressed their fears to children. Children of mothers who had never expressed their fears to them had the lowest anxiety scores. Consistent with this, Aktar, Majdandzic et al. (2013) found that, regardless of parental anxiety diagnosis, in a social referencing experiment, infants whose parents expressed anxiety to or in front of them were more avoidant of a novel stimulus.

3.6 Expressed emotion

Another concept which has been found useful in the assessment of the quality of specific relationships is expressed emotion (EE). It is measured by coding reports of an individuals' thoughts and feelings about a particular person and taps the overall

quality of the relationship, criticism and emotional over-involvement, yielding a dichotomous high/low variable. A person can be scored 'high expressed emotion' in relation to another individual on the basis of negative statements about the relationship, criticism or 'emotional overinvolvement' (intrusive care, excessive emotion or overprotective attitudes expressed about the person).

The concept was first described by Brown and Rutter (1966) and Vaughn and Leff (1976) who noted that for relatives of people with schizophrenia, family criticisms and attitudes were predictive of the individual's relapse. It has since been linked with relapse in a range of disorders including depression, eating disorders and social anxiety (Hooley 2007). The concept has been explored with regard to parents and children with or at risk of developing disorders. High EE in parents has been found to relate to behavioural problems (Psychogiou, Daley et al. 2007), social anxiety therapy outcome (Garcia-Lopez, Muela et al. 2009) and depression (Asarnow, Tompson et al. 1994). There has been some evidence that EE, in particular high criticism may relate to the onset of depression in children (Burkhouse, Uhrlass et al. 2012). High maternal EE has also been linked with concurrently measured attachment disorganisation at six years (Jacobsen, Hibbs et al. 2000).

Initially measured by means of a lengthy transcribed interview (the Camberwell Family Interview, CFI), a shorter five minute speech sample (FMSS) was developed by Magana, Goldstein et al. (1986). When compared, they found the FMSS to be somewhat more conservative than the CFI with fewer ratings of high EE. Most research in the area now utilizes the FMSS. The indirect nature of the method (the respondent is simply asked to describe their thoughts and feelings about the target

person) provides an interesting comparison to other more explicit means of assessing relationships such as questionnaires.

3.6.1 Expressed Emotion and child anxiety

Given the associations between overprotective parenting and child anxiety (Chorpita and Barlow 1998; Wood, McLeod et al. 2003)**,** EOI, and the overinvolvement subcategory has been thought to be particularly associated with anxiety (Stubbe, Zahner et al. 1993).

Hirshfeld, Biederman et al. (1997) reported on a study of mothers with panic disorder and their 4-10 year old children and a second sample of children identified as being behaviourally inhibited in infancy and followed to age 11. In both samples high EE was associated with maternal psychopathology. In mothers with anxiety disorders maternal criticism was significantly associated with child inhibited temperament (inhibited temperament is discussed more fully below) independent of the child's number of disorders (at age 10-11). Additionally, in mothers with anxiety disorders only, maternal criticism was also significantly associated with a higher number of child disorders. Emotional overinvolvement was associated with child separation anxiety in this sample. Therefore high EE (or the implied underlying relationship) including both criticism and overinvolvement has been implicated in the development of child anxiety, particularly with children whose temperament is considered behaviourally inhibited. This appears to be true for mothers with specific anxiety disorders, namely panic.

3.6.2 Expressed emotion and OCD

Family relationships are very important in the prognosis of OCD. Poor family functioning (including family accommodation of symptoms as well as EE) has been identified as a predictor of symptom severity and treatment outcome both in children and adults with OCD (Hibbs, Hamburger et al. 1993; Amir, Freshman et al. 2000; Merlo, Lehmkuhl et al. 2009; Peris, Sugar et al. 2012; Taylor, Abramowitz et al. 2012; Boeding, Paprocki et al. 2013; Cherian, Pandian et al. 2013).

High EE has been found to relate to general measures of family dysfunction including the marital relationship in families where a child has OCD (Hibbs, Hamburger et al. 1993) and has been associated with parental diagnosis in parents of children affected by OCD or other disorders (Hibbs, Hamburger et al. 1991).

Both criticism and EOI appear to play important roles in OCD, although their roles as causal and/or maintaining factors are less clear (Pace, Thwaites et al., 2011). Hostile criticism and EOI predicted dropout in one study but interestingly, non-hostile critical comments were found to predict better treatment outcome (Chambless and Steketee 1999). Criticism may be important in OCD as it adds more load on an already aroused autonomic nervous system. Skin conductance studies have found that children with OCD are more reactive to criticism (Hibbs, Zahn et al. 1992).

Studying adults with OCD, perceived criticism from relatives has been related to symptom severity (De Berardis, Campanella et al. 2008) and was a better predictor of poor treatment outcome than pre-treatment severity (Renshaw, Chambless et al. 2003). Parents (and not spouses) of people with OCD who attributed negative

events in an observational task to their disorder were found to be higher on EOI. Patients of relatives who made such comments did worse in treatment, controlling for EE.

Few studies have examined the sufferer's perspective in terms of EE and their perceptions of relationships with key others including their own criticism and overinvolved behaviours towards others, which may or may not include clinical obsessive behaviours. In an interesting exception Przeworski, Zoellner et al. (2012) assessed maternal, paternal and child EE where the child had OCD and there was an unaffected sibling. 10.9% of mothers were high EE about the affected child versus 2.9% about siblings. Children with OCD were high EE regarding 11.9% of mothers and 10.2% of fathers. High EE was primarily characterised by criticism rather than overinvolvement in either mother or the child with OCD, and EE in either was related to worse treatment outcome. Challacombe and Salkovskis (2009) found elevated rates of high EE in mothers with OCD of school age children compared with controls, with mothers expressing more overinvolvement *and* critical comments towards children.

3.6.3 EE and younger children

Although well utilised with older children and adults, the validity of the original FMSS coding with very young children and infants has been questioned on a number of bases. Most prominent is the coding of EOI and the need to take into account the normal requirements and emotions concerning parenting of a young child. Vostanis, Nicholls et al. (1994) found low levels of EOI in parents of primary

school age children with emotional and conduct disorders, which they attributed to the difficulty in coding self-sacrifice and excessive praise with young children, given the normalcy of these expressions. Reliable coding of EOI in parents of infants may therefore present difficulties (Daley, Sonuga-Barke et al. 2003) with some researchers discarding this category (Psychogiou, Netsi et al. 2013).

However, other studies have attempted to include this code. St Jonn Seed and Weiss (2005) used a modified video recorded FMSS with additional prompts and incorporating non verbal content in the coding system. They assessed a community sample of 81 women regarding their six month old children. They found family satisfaction to be inversely related to criticism, indicating the importance of external as well as internal determinants of EE such as mood. Further they noted that the more stress a mother experienced the more likely she was to show EOI. However, clinical measures of mental health were not associated with EE.

Others have found an association between maternal depression and negative comments in the FMSS (Barnes, Ram et al. 2007; Psychogiou, Netsi et al. 2013) and also between maternal depression and subsequent paternal criticism on maternal EE (Psychogiou, Netsi et al. 2013), highlighting wider and distal effects on the family system from parental psychopathology and behaviour. There are no studies examining the longer term implications of high EE expressed by a parent in infancy, although one study of preschool EE found that it did not predict children's behaviour problems in the first grade. Maternal stress however was predictive Baker, Heller, et al. ,2000).

Researchers have noted that overtly critical comments are unusual in the speech samples of parents of very young children (St Jonn Seed and Weiss 2005; Psychogiou, Netsi et al. 2013). Therefore modifications to capture qualified criticism and mild criticism have been made. The coding of warmth was not included in the original five minute speech sample but has often been used in ratings of parents as this quality is considered central to optimal parenting (St Jonn Seed and Weiss 2005; Psychogiou, Netsi et al. 2013).

Maternal anxiety has not been specifically studied in relation to EE and young children.

3.7 OCD, attachment and parenting interactions

Research into the parenting experienced by those with psychiatric disorders is important not only in understanding the development and maintenance of their symptoms but also because such experiences may become particularly relevant when they become parents themselves. Recollected parenting and attachment representations can influence perinatal mood, parenting interactions and attachment with children (Fonagy, Steele et al. 1991; Benoit, Parker et al. 1997; Mayes and Leckman 2007). Recalled parenting behaviours and attachment representations are conceptually distinct and both are potentially important to consider in terms of understanding the early environment (Manassis, Owens et al. 1999).

3.7.1 Recollected parenting in adults with OCD

Quality of parenting has often been assessed along three dimensions: warmth; rejection; and overprotection/control, which have been shown to be important in the development of both depression and anxiety (Rapee 1997). The extent to which adults' accounts of parenting in their childhood are valid reflections of *actual* parental behaviour rather than idiosyncratic reflections of *perceived* parenting influenced by their personality and/or psychopathology has been a matter of debate (Gerlsma, Snijders et al. 1997). Measured in childhood, parent and child ratings of parenting show little agreement (Muris, Bogels et al. 1996). Recollected parenting has been shown to be stable even in the light of significant improvements in mood after therapy (Gerlsma, Kramer et al. 1994). However, it is not clear from this data if a deterioration of mood would have an effect.

Several authors have investigated retrospective ratings of parenting style in people with OCD, using clinical and non clinical samples.

3.7.1.1 Clinical studies

Some studies have found that parenting experienced by people with OCD is characterised by low warmth and more parental overprotection and control (Wilcox, Grados et al. 2008; Lennertz, Grabe et al. 2010), although Alonso, Menchon et al. (2004) only found an association between hoarding and low warmth. However, the specificity to OCD was not tested as these studies lacked a psychiatric control group (Alonso, Menchon et al. 2004; Lennertz, Grabe et al. 2010). Studies using control groups have found that overprotective and low warmth parenting is

not specific to OCD: recalled parenting by people with other anxiety disorders has also shown parents were rated as less warm, more rejecting and overprotective compared with healthy controls (Arrindell, Kwee et al. 1989; Turgeon, O'Connor et al. 2002; Heider, Matschinger et al. 2008). Still other studies have not found a relationship beween parenting practices and OCD relative to controls, or that people with OCD have experienced more optimal parenting than depressed participants who reported lower maternal warmth and higher maternal overprotection (Vogel, Stiles et al. 1997; Myhr, Sookman et al. 2004).

In an important study to address specificity of parenting style within families, (Lennertz, Grabe et al. 2010) investigated siblings' recollections of parenting as well as those of OCD sufferers. They found those with OCD reported their parents to be less warm and more rejecting and controlling than did their unaffected siblings. In an attempt to address the possibility that having a child with OCD may elicit less optimal parenting behaviours, they spilt their sample into early and late onset OCD and found no difference in the pattern of results, supporting their conclusions that an adverse parenting style may serve as a risk factor for OCD. Interestingly in large a clinical sample, Wilcox et al (2008) found an association between maternal overprotection and OCD symptoms only in those who did *not* have a parent with OCD, suggesting that OCD itself may not impact on parenting styles.

3.7.1.2 Non clinical studies

Larger studies of non-clinical participants (generally using student samples) have also found positive associations between obsessional symptoms and overprotective (Ehiobuche 1988; Cavedo and Parker 1994; Smari, Martinsson et al. 2010) or

authoritarian parenting styles (Timpano, Keough et al. 2010) even after controlling for mood and general anxiety symptoms, (although contrasting results were found by Mancini, D'Olimpio et al. (2000).

3.7.2 Early experience and beliefs relevant to the development of OCD

Another means by which early experience may influence vulnerability to OCD is the impact on the formation of relevant beliefs. Beck (1976) proposed that early life experiences give rise to core beliefs which function as the basis for the interpretation of subsequent experiences, including internal stimuli such as thoughts and feelings.

Inflated responsibility beliefs are a key concept in the cognitive model of OCD (Salkovskis, Wroe et al. 2000); see section 1.1.4 above. The specific definition of responsibility in this model is:

'The belief that one has power which is pivotal to bring about or prevent subjectively crucial negative outcomes. These outcomes are perceived as essential to prevent. They may be actual, that is, having consequences in the real world and/or at a moral level' (Salkovskis, 1996).

In a theoretical paper discussing routes to the development of increased responsibility beliefs, Salkovskis, Shafran, Rachman & Freeston (1999) speculated that one pathway for this to occur could be an early developed and broad sense of responsibility that is deliberately or implicitly encouraged during childhood. This may develop if the child has to assume actual responsibility within the home, but may also arise if the child is scapegoated for events outside his or her control. A

second possible parental influence on the development of inflated responsibility could also be that rigid and extreme codes of conduct and duty are imposed on the child. A third possible mechanism may be excessively anxious parents explicitly or implicitly withholding responsibility from the child. Such parents may convey the sense that problems and threat are constantly present and that outside is an unpredictable and threatening place, without developing a sense in the child that they are competent to deal with such difficulties. Finally, a child may perceive they were responsible for harm, or may in fact have been responsible for harm. Inflated responsibility could therefore be attributable to parental influence, other childhood experiences, or a combination of the two.

General support for the influence of early experience on responsibility beliefs has been found in that recalled over-protective and authoritarian parenting styles were found to be linked with responsibility appraisals (as well as other belief domains). These appraisals partially mediated the relationship between parenting and obsessive-compulsive symptoms (Timpano, Keough et al. 2010). To investigate the pathways described by Salkovskis et al (1999) more directly, Coles et al, devised the 'Pathways to responsibility beliefs scale' PRBQ (Coles and Schofield 2008). This identified four factors in line with the theoretical paper (rigid rules, heightened responsibility, over protection and causing or influencing harm) finding relationships between all pathways and obsessive belief domains using the OBQ in a student sample. Using an Icelandic translation of the PRBQ, (Smari, orsteinsdottir et al. 2010) found that responsibility attitudes partially mediated the association between PRBQ pathways and obsessive symptoms in students.

A recent study examined direct and indirect relationships between early experiences using the PRBQ, responsibility interpretations of specific intrusions and obsessive symptoms using a student sample. PRBQ scales predicted several OC symptom domains in female participants (and far fewer in males). 'Responsible childhood' (being given too much responsibility) predicted washing, obsessing, arranging and checking. 'Rigid rules' predicted arranging and 'overprotective parenting' predicted obsessing and hoarding. Experiences of actual or imagined harm predicted obsessing, hoarding and arranging. For 'responsible childhood' and 'experiences of actual or imagined harm', responsibility interpretations (using the RIQ) fully mediated the relationship with obsessing, hoarding, arranging and checking symptoms (Adams 2012).

Looking more widely, (Careau, O'Connor et al. 2012) examined childhood experiences and examined the associations with theoretically linked obsessive belief domains. Experiences of 'threat perception' (observing or hearing something from parents that transmitted a fear) were related to OBQ Overestimation of threat. Experiences of responsibility (e.g. taking care of others or feeling responsible for parental happiness) were related to OBQ responsibility and experiences of sociotropy related to OBQ perfectionism. There was also support for a nonspecific vulnerability model as threat perception and sociotropy related to most OBQ belief domains to some degree. So far all the studies examining these relationships have utilized student rather than clinical samples and the specificity of these relationships to obsessive rather than other mood and anxiety symptoms has not been tested.

Examining the intergenerational transmission of beliefs, there is evidence of patterns of concordance between parent and child beliefs in somatising disorders (Marshall, Jones et al. 2007), eating disorders (Stein, Woolley et al. 2006) and depression (Jaenicke, Hammen et al. 1987). Investigations of the concordance between maternal and child beliefs in OCD have found moderate correlations between responsibility beliefs and threat estimation (Pietrefesa, Schofield et al. 2010). The finding that unaffected relatives of people with OCD are more likely to share important beliefs related to the disorder such as responsibility appraisals and overestimation of threat suggests a familial component (Rector, Cassin et al. 2009). Relatives of those with early onset OCD also scored highly on the domain tapping perfectionism and intolerance of uncertainty, providing some support for the notion of familial risk. Cook and Kearney (2009) found a relationship between mothers and sons perfectionism which was mediated by obsessive compulsive symptoms. Jacobi, Calamari et al. (2006) found an indirect relationship between parents and offspring symptoms which was mediated by obsessive beliefs in a non clinical sample of parents and adolescents.

Genetics may play a role in the strengths of some beliefs or general vulnerabilities. Taylor, Afifi et al. (2010) found genetic factors explained 32-40% of the variance in OBQ subscale scores.

Overall there is evidence that early experience including general parenting style and experiences conveying threat can influence the formation of beliefs which act as vulnerability factors for obsessive-compulsive symptoms or can interact with those beliefs to create vulnerability.

3.7.3 Attachment in adults and children with OCD

Given the findings linking non-optimal parenting and OCD and that insecure attachment in infancy is associated with anxiety in childhood and adulthood, some researchers have sought to investigate the relationships between attachment, obsessive beliefs and symptoms. However, these studies take have not used the SSP or the AAI but rather questionnaire measures of attachment anxiety and avoidance, which may reflect more general feelings of security in relationships rather than attachment per se (Doron, Moulding et al. 2009; Yarbro, Mahaffey et al. 2013). Theoretically these attachment feelings are linked to early attachments to the primary caregiver and the formation of internal working models of relationships (Shaver and Mikulincer 2002; Mikulincer, Shaver et al. 2003). However, the basis for this supposition has been questioned given very little evidence as to developmental antecedents of attachment in romantic relationships (Belsky 2002).

Questionnaire measured attachment anxiety or avoidance may reflect vulnerability to OCD in a general sense by links with negative self-schema, and perceptions of social or physical threat (Doron and Kyrios 2005; Doron, Kyrios et al. 2007). In support of this Doron, Moulding et al. (2012) found attachment anxiety to be more prevalent in people with OCD than other anxiety disorders. Female children reporting more positive feelings to parents reported fewer obsessive compulsive symptoms (Rezvan, Bahrami et al. 2012).

The distinction between attachment feelings or state of mind and reported parenting is an important one. Despite finding no difference between people with

OCD and controls in terms of parenting practices, Myhr, Sookman et al. (2004) did find that both in the OCD and depressed group, a greater proportion of people rated themselves as insecure on a questionnaire measure (the revised adult attachment scale). Investigating a student sample, Yarbro, Mahaffey et al. (2013) found that attachment anxiety partially mediated the association between reports of parent-child relationships and obsessive beliefs; attachment avoidance failed to operate as a mediating mechanism. Doron, Moulding et al. (2009) found that attachment anxiety and avoidance were related to obsessive compulsive symptoms and that both were fully mediated by obsessive compulsive beliefs.

Few studies have examined attachment categorically in adults or children with OCD using the AAI or CAI. Using the AAI Manassis, Bradley et al. (1995) found that all of their sample of 18 mothers with anxiety disorders (including 4 with OCD or comorbid OCD) showed insecure attachment patterns. Seven of these had experienced sexual abuse. One study investigating adolescents found 60% of their OCD sample to be dismissing in attachment style, compared with 16% of a depressed group and 36% of controls. Many more of the depressed adolescents were unresolved (40% compared with 12% in the OCD and control groups), despite similar rates of loss experiences across all the groups. However, experiences of abuse were more prevalent in the depressed group (Ivarsson, Granqvist et al. 2010).

3.7.4 Parental OCD and the impact on children

Few studies have examined the impact of parental OCD on children outside the increased risk of developing OCD described above. Black, Gaffney et al. (2003) examined psychopathology in offspring of people with OCD and controls and followed them up two years later. They found differences between the two groups of children in terms of internalizing, anxiety and somatic problems were present at both timepoints. They also found a difference in engagement with activities on the CBCL between children of OCD and control parents (but this was not present at two year follow up). Challacombe and Salkovskis (2009) found statistically (but not clinically) significant differences in anxiety between children of mothers with OCD and panic relative to healthy controls. Few differences were found between the anxious groups but mothers with OCD showed more high EE, and reported they would be more punitive in situations where their child exhibited obsessional symptoms. Children of mothers with OCD showed more anxiety in interactions, and this correlated with the degree of awareness the mother perceived the child to have about their disorder. Children of mothers with panic disorder showed the lowest competence scores, highlighting the need to examine lack of strengths as well as the presence of difficulties.

In terms of environmental mechanisms, several have been hypothesised to explain the increased rates of pathology and compromised strengths in offspring of affected parents: parenting style, modeling of compulsions/exposing the child to parental anxiety and general stress (including lack of emotional availability) from living with an anxious parent (Challacombe and Salkovskis 2009).

Lower confidence in the child and less rewarding of autonomy has been shown in interactions by in parents of children with OCD, even relative to other anxiety disorders (Barrett, Shortt et al. 2002). This was mirrored in an observational study of mothers with OCD who were less promoting of psychological autonomy and less warm in interactions than healthy (but not anxious) controls. Children of mothers with OCD only appeared more anxious in interactions (Challacombe and Salkovskis 2009). Mothers with OCD in this study also expressed more criticism of their children and reported more punitive parenting behaviours if the child exhibited obessional behaviour compared with both anxious and healthy controls. Compared with mothers with panic, mothers with OCD appeared to be more astute in their assessment of the impact on their children, with perceptions of the impact correlating with child competence and anxiety.

Although the effects of parental modeling are potentially powerful (see section 3.5.4 above), no studies have examined this within OCD. Children's participation in or observation of parental compulsions and rituals has been suggested as a possible mechanism of influence (Black, Gaffney et al. 2003). Studies of the pervasiveness of family accommodation in adult family members living with an OCD sufferer suggest it is likely to occur. The developmental stage of the child is likely to be an important factor in how much the child is exposed to or affected by parental compulsions.

3.7.4.1 Postnatal OCD and mother infant interactions

Even in pregnancy, rigid following of health advice can exacerbate obsessional anxiety, such as counting baby movements in utero (Brockington, Macdonald et al. 2006). There have to date been no systematic studies of the impact of postnatal

OCD on early parenting interactions. However, several case studies have added to a general clinical picture of postnatal OCD by including descriptions of disruptions in parenting and specific behaviours driven by maternal OCD.

Given the typical predominance of caregiving tasks in the daily life of a mother of a young child, it is not surprising that obsessions and compulsions intertwine or interfere with these tasks.

For mothers concerned about contamination, excessive cleaning is a commonly reported symptom (Diaz, Grush et al. 1997). For example, Buttolph and Holland (1990) described a mother who constantly washed the baby's hands and anything the baby had been in contact with. The mother spent hours spent washing bottles and cleaning the baby's clothes which were changed several times per day.

In several instances due to fear of intrusive thoughts, avoiding time with the child is a prominent feature (Sichel, Cohen et al. 1993; Diaz, Grush et al. 1997; Arnold 1999). Mothers may also avoid particular objects such as knives, interfering with cooking or may avoid situations where the child may be in contact with others such as parent-child groups (Buttolph and Holland 1990).

Mothers may try to delegate *all* or be unable to delegate *any* tasks of caregiving due to fears of their own thoughts or contamination from others respectively (Buttolph and Holland 1990; Arnold 1999). Again this may have particular effects depending on the developmental stage of the child. At this or later stages, a mother may take the child to the general practitioner for excessive and unnecessary checkups (Arnold

1999). Checking of the baby for symptoms and breathing in the night is a common feature.

Some impact on the family system has also been described. For example, excessive reassurance seeking from partners or demanding that they meet obsessional standards of cleanliness appear to be common (Buttolph and Holland 1990; Christian and Storch 2009).

Although the anecdotal evidence of interference in daily tasks is increasingly documented, nothing is yet known about the more profound implications of this interference in terms of the mother-child relationship, especially if it persists.

OCD, along with other disorders has been linked with compromised parenting including both overprotective or authoritarian styles. These parenting styles may increase the likelihood of developing cognitive vulnerabilities to OCD such as increased responsibility appraisals, perfectionism, or to obsessive symptoms themselves. The extent to which parents with OCD themselves exhibit these parenting styles has not been studied. Generally speaking the impact of OCD on the parenting style of affected parents is not clear, and there have been no studies on parenting in mothers of infants.

3.8 Contextual variables related to early parenting and maternal mental health

Whilst parenting styles and interactions are very important in understanding the early life of an infant, a number of additional variables have been highlighted as

important contributors. These include infant temperament, the romantic (marital) relationship, general social support and feelings of maternal self-efficacy.

3.8.1 Infant temperament

Infant temperament has been defined as 'individual differences in reactivity and self-regulation assumed to have a constitutional basis' with 'constitutional' defined as 'the relatively enduring biological makeup of the individual influenced over time by heredity, maturation and experience' (Rothbart, Ahadi et al. 2000). Two aspects of infant temperament have been shown to be particularly important in the context of maternal disorders and child psychopathology. These are infant 'difficultness' and behavioural inhibition.

3.8.1.1 Infant difficultness

Difficultness is observable from early infancy and has been defined as frequent demonstrations of negative affect, irregularity in patterns of eating and sleeping and intense aversion and slow adaptation to novelty (Thomas, Chess et al. 1968; Bates, Freeland et al. 1979; Kagan 1982). There is evidence of moderate concordance between maternal and paternal report of infant temperament, which also correlated with lab procedure to assess infant irritability (Atella, DiPietro et al. 2003). However, maternal characteristics such as personality and distress have been found to contribute to ratings of difficultness (Bates, Freeland et al. 1979; Forman, O'Hara et al. 2003; Mantymaa, Puura et al. 2006).

Infant difficultness may have a reciprocal relationship with parenting, with a difficult temperament more likely to elicit negative maternal behaviours which in turn can

exacerbate and maintain aspects of the temperament (Power, Gershenhorn et al. 1990; Boivin, Perusse et al. 2005). Observed fussing and crying has been linked with unresponsive maternal behaviour (Crockenberg and Smith 1983) and a fussy temperament was related to more critical remarks in the FMSS (Barnes, Ram et al. 2007).Mills-Koonce, Propper et al. (2012) found soothability measured at 6m to predict insecure-ambivalent attachment at 12m.

In a longitudinal investigation of temperament and attachment, infant reactivity did not differ between groups at 5 months but at 12m there were differences in infant reactivity according to ABC categorisations, leading to the suggestion that variations in maternal responsiveness may have led infants to maximise or minimise expressions of distress (Sherman, Stupica et al. 2013). Positive engagement when the infant is stressed may have an impact on infant behaviour and assist regulation (Richter and Reck 2013).

Other variables may also play a role: mothers with irritable infants and poor social support were more likely to have insecure infants, where no relationship was found for mothers with good social support (Crockenberg 1981). In contrast to this, Sroufe et al reported an association between neonatal irritability and anxious/resistant attachment. Further they found that caregiver sensitivity had a greater effect on infants who were low in irritability. Irritability was related to maternal sensitivity at six months, and sensitivity mediated the relationship between irritability and attachment (Sroufe 2005).

Depressed mothers have been found to rate their infants as more difficult than non-depressed (McGrath, Records et al. 2008) and moderate correlations have been

found with anxiety (r=0.3-0.43) (McMahon, Barnett et al. 2001). Using data from the large longitudinal ALSPAC sample of 14663 pregnancies, maternal depressive symptoms at 6m predicted more difficult child temperament at 24m, with little evidence found for child to parent effects. Paternal depression was predictive of more difficult temperament in boys only (Hanington, Ramchandani et al. 2010). However the effects of temperament on parental mood and behaviour may be established earlier than six months. Infant temperament, in particular neonatal irritability was found to be predictive of maternal depression by eight weeks postpartum (Murray, Stanley et al. 1996).

Examining infant temperament in children of anxiety disordered mothers, Reck, Müller et al. (2013) found a difference in mother rated response to novelty on the IBQ in a mixed diagnosis anxiety group, although this became non significant when controlling for infant age and number of children. Infant distress to novelty was correlated with maternal reported avoidance behaviour (on the mobility inventory) and infant cortisol levels in the still face paradigm. The groups also differed in terms of infants of anxiety disordered mothers being more distressed at restriction, smiling and laughing more, and showing more motor activity.

Infant difficultness has been shown to relate to later personality characteristics such as inadaptability and low mood (Guerin and Gottfried 1994). Interestingly, maternal ratings of negative temperament at 4-6 weeks were found to relate to attachment insecurity in adulthood i.e. 30 years later (Broussard and Cassidy 2010).

3.8.1.2 Behavioural inhibition

Kagan, Reznick et al. (1987) define behavioral inhibition (BI) as "the tendency to display or not to display an initial period of inhibition of speech and play, associated with a retreat to a target of attachment, when the child encounters an unfamiliar or challenging event" (p. 54). Behavioural inhibition can be formally categorised from the ages of 14 months to 5 years, but is thought to have temperamental precursors such as distress to novelty, soothability, and some of the characteristics of difficultness described above.

BI has been linked to the development of shyness, social anxiety disorder and anxiety disorders in childhood and adulthood (Biederman, Rosenbaum et al. 1990; Kagan, Snidman et al. 1999; Biederman, Hirshfeld-Becker et al. 2001; Coles, Schofield et al. 2006; Hirshfeld-Becker, Biederman et al. 2007). There is discontinuity as well as continuity in BI (Degnan and Fox 2007). As Kagan points out, the presence of BI constrains the probability of being fearless rather than determines anxious pathology in itself although it is, combined with other factors, a risk (Kagan and Snidman 1999).

As with infant difficultness, parental interactions with the inhibited child may increase or decrease the risk of characteristics being amplified. A moderating effect of attachment has been found on social competence for infants with behavioural inhibition (Bohlin, Hagekull et al. 2005). Aktar, Majdandzic et al. (2013) found that the amount that anxiety was expressed, rather than parental anxiety disorder per se interacted with behavioural inhibition to predict infant avoidance to a novel stimulus in a social referencing paradigm. The interaction between social

referencing and behavioural inhibition was also found by (Murray, de Rosnay et al. 2008).

Further, in an important study Bergman, Sarkar et al. (2008) found a moderating influence of attachment between maternal antenatal stress and subsequent child fearfulness.

Studies have produced mixed results regarding levels of BI in children of anxiety disordered parents. Manassis, Bradley et al. (1995) found 65% of their sample of infants of mothers with anxiety disorders to be behaviourally inhibited.

However, Warren, Gunnar et al. (2003) examined two groups of infants of mothers with panic disorder with babies of 4 and 14 months. They found no differences between clinical infants and controls for BI measured with a robust observational measure at 14 months . At 4 months, the infants of mothers with panic were more often independently rated as being less reactive. However, maternal report indicated more distress to novelty at 4 months. Infants in both cohorts did differ from controls in cortisol levels, but only for those measured in the laboratory setting rather than at home at 14 months.

3.8.2 Marital relationship

An important source of support or stress is the marital relationship (the term marital relationship is used here for ease to describe the relationship between parents of the child). Marital stress has been found to be a risk factor for postnatal depression (O'Hara and Swain 1996; Dennis and Ross 2006). It has also been found to be an independent risk factor for adverse child outcomes and mediates

relationship between postnatal depression and child problems at 4 yrs (Hanington, Heron et al. 2012). Higher perceived partner support has been found to buffer the relationship between maternal depression and compromised birth outcomes (Nylen, O'Hara et al. 2013) as well as protect against reduced sensitivity (Crockenberg and Leerkes 2003).

Interestingly, a greater impact of the quality of the marital relationship has been found on the fathers relatonship with children than the mothers in the early years (Belsky, Youngblade et al. 1991; Sokolowski 2006). This may be as the mother often plays a dominant role in caregiving and paternal relations with and even access to the child can depend to some extent on that relationship. Mothers' interactions with children have been found to be more robust to negative changes in the marital relationship (Belsky, Youngblade et al. 1991).

A supportive marital relationship can help with engagement with treatment and symptomatic improvement (Misri, Kostaras et al. 2000; Brandon, Ceccotti et al. 2012).

3.8.3 Social support and parenting stress

Greater maternal social support in general and lower parenting stress is also related to improved maternal functioning (Haslam, Pakenham et al. 2006). It may be particularly important in 'high risk' i.e. less well resourced families. Crockenberg found infants of mothers with higher social support showed fewer anxious behaviours in the strange situation. The study suggested an interaction between 'difficult temperament' and low social support and insecure attachment

(Crockenberg 1981). Similarly parenting stress was found to be related to child behaviour only in insecure children at three years of age (Tharner, Luijk et al. 2012). Perceived stress can influence expressed emotion towards children and infants (Baker, Heller et al. 2000; St Jonn Seed and Weiss 2005).

3.8.4 Parenting self-efficacy

Self-efficacy refers to one's belief in the ability to successfully perform the behaviour necessary to achieve a desired outcome (Bandura 1977). Maternal self-efficacy is therefore personal belief in the ability to function effectively in the mothering role. Variables such as infant temperament and other stressors are therefore likely to have an impact on the difficulty of the task in hand, and these may influence self-efficacy, which in turn may influence outcomes. In conditions of stress parenting interactions were not affected if self efficacy was high (Leerkes and Crockenberg 2002). Higher levels of self-efficacy have been related to improved maternal and child outcomes (Haslam, Pakenham et al. 2006) and social support has been found to be protective of maternal depressive symptoms via the mediation of self-efficacy (Cutrona and Troutman 1986). Lower maternal self-efficacy has been related to maternal separation anxiety at 6 months with higher self-efficacy buffering the relationship between infant temperament and separation anxiety (Hsu and Sung 2008).

The antecedents of parenting self-efficacy have not been well described. Having an effective model of parenting that elicits feelings of self-worth has been thought to influence subsequent parental self-efficacy. Consistent with this Leerkes and

Crockenberg (2002) examined parenting self-efficacy at six months and found that it was predicted by recalled care. Unsurprisingly, maternal self-efficacy increases with parenting experience over time (Porter and Hsu 2003) and with the experience of parenting more than one child (Fish and Stifter 1993). Perhaps surprisingly, maternal self-efficacy has not been widely studied in postnatal groups with clinical disorders. It has not been examined in mothers with OCD.

3.9 Chapter 3 Conclusions

- *A body of research supports the idea that early experiences are very important in the development both of risk and resilience to psychopathology for both mother and child.*
- *Insecure attachment is particularly important as it is both a risk factor for and outcome of psychopathology.*
- *Mother-infant interactions and sensitivity are influenced by concurrent maternal psychopathology including anxiety although there is increasing evidence that effects are disorder and situation specific.*
- *One issue rarely addressed in the literature is the developmental stage of the child and the different challenges that may present within specific disorders.*
- *Mothers with anxiety disorders may have higher rates of insecurely attached infants. Compromised interactions may be one mechanism by which attachment is affected.*
- *Mother-infant interactions and attachment in the context of OCD have not been studied despite reports of considerable interference in parenting.*

4. Identifying and treating OCD in the perinatal period

Whilst the research and clinical focus on perinatal depression and psychosis has been longstanding, there is increasing recognition that anxiety is a common form of pathology both in community and referred perinatal samples (Matthey, Barnett et al. 2003; Austin, Hadzi-Pavlovic et al. 2010; Grigoriadis, de Camps Meschino et al. 2011). In this chapter I will discuss the prevalence and treatment of postnatal depression and anxiety, and the detection in general of postnatal mental health problems with a view to understanding how OCD can be detected and treated.

4.1 Perinatal mental health problems

4.1.1 Perinatal depression

Postnatal depression is important as it is probably the most prevalent disorder of the perinatal period, and is often comorbid with other disorders including OCD. It is therefore important to describe a brief context for depression to provide comparisons with perinatal anxiety and OCD in particular.

Postnatal depression affects 7-13% of women in the postnatal year and approximately 3-3.5% of fathers (O'Hara and Swain 1996; Gavin, Gaynes et al. 2005; Ramchandani, Stein et al. 2005; Vesga-Lopez, Blanco et al. 2008). The rate is considerably increased to 19-26% when minor depression is included (Gavin,

Gaynes et al. 2005; Austin, Hadzi-Pavlovic et al. 2010). Severity level may have different implications for care, with stepped care models helping to provide appropriate intervention for differing levels of severity (Pollack, Segre et al. 2011).

Compared with rates of depression at other times of a woman's life, there is evidence that antenatal depression may be less common, although postnatal depression may be more common. One study reported an odds ratio of 1.52 for the increased risk of developing postnatal depression (Vesga-Lopez, Blanco et al. 2008). However, evidence from other studies is not conclusive (Gavin, Gaynes et al. 2005). This echoes the findings from studies of postnatal OCD that, whilst being a common and disabling problem in the postnatal period, unfortunately this is true in general and depression is not vastly more prevalent than at other times.

Perinatal depression has been found to have negative effects on maternal interactions (Cohn, Matias et al. 1986), infant behaviour(Cohn, Matias et al. 1986), mother-infant attachment (Martins and Gaffan 2000), child competence and behavioural problems (Murray and Cooper 1996), their subsequent vulnerability to depression (Pawlby, Sharp et al. 2008) and antisocial behaviour in adolescence (Hay, Pawlby et al. 2003).

Considerable research evidence has accrued that antenatal depression has been found to be predictive of postnatal problems in interaction, and to a greater extent than postnatal depressive symptoms (Pearson, Melotti et al. 2012). The same group has demonstrated that maternal education buffers the effects of postnatal but not antenatal depression on depression in offspring (Pearson, Evans et al. 2013). Prenatal exposure to maternal anxiety and depression can influence infant

temperament (Davis, Snidman et al. 2004; Davis, Glynn et al. 2007) indicated that the infant is affected by changes in the uterine environment in more lasting ways.

4.1.2 Perinatal anxiety

There have been far fewer studies on perinatal anxiety. Studies using dimensional measures have shown that anxiety is a common source of perinatal psychiatric morbidity and may rise over the postnatal period e.g. (Stuart, Couser et al. 1998; Paul, Downs et al. 2013). Significant levels of anxiety appear to be very common in both pregnancy (7.3-17%) and the postpartum (4.4-13%). (Wenzel, Haugen et al. 2003; Heron, O'Connor et al. 2004; Mauri, Oppo et al. 2010; Paul, Downs et al. 2013; Prenoveau, Craske et al. 2013). In addition, anxiety and in particular GAD is an often a precursor to depression (Coelho, Murray et al. 2011) and is frequently comorbid with depression (Heron, O'Connor et al. 2004).

4.1.2.1 Prevalence of other postnatal anxiety disorders

Anxiety disorders also appear to be very common in the postpartum. Austin, Hadzi-Pavlovic et al. (2010) found that 37.7% of women with depression had an anxiety diagnosis and 8.1% of the sample had a primary anxiety disorder. Overall 20.4% of the sample had an anxiety disorder (although there was considerable attrition in the postnatal follow up).

Considering specific postnatal anxiety disorders, GAD was found to have a prevalence of 8.2%, Social phobia 4.1% and panic 1.2% at 8 weeks postpartum in a community sample (Wenzel, Haugen et al. 2005). This study found a prevalence of OCD of 2.7% which was also the median prevalence rate of 2.7% for OCD based on

the literature review of Chapter 2. Prevalence rates of subclinical syndromes for the different disorders varied from 0 (panic) to 19.7% (GAD). The rate of subclinical OCD was 5.4% in this study. 65% of the women diagnosed with anxiety disorders in this study experienced postnatal onset.

A review of panic disorder in the perinatal period found that 44% of women had an exacerbation of panic in the postnatal period, whilst 10% had a new onset (Hertzberg and Wahlbeck 1999). Other studies suggest that panic stays the same or improves for 65% of women (Cohen, Sichel et al. 1994). Intriguing research suggests that lactation may ameliorate stress or anxiety, as a proportion of women reported recurrence of panic symptoms at the point of termination of breastfeeding (Ross and McLean 2006).

4.1.2.2 Predictors of perinatal anxiety

Meta-analyses have indicated the following predictors of postnatal depression: depression and anxiety during pregnancy, postpartum blues, previous history of depression, stressful life events (including childcare-related stressors), a poor marital relationship, and poor social support (O'Hara and Swain 1996; Robertson, Grace et al. 2004). A single study (conducted in Sweden) has systematically examined risk factors for developing antenatal anxiety and found that being a non native Swedish speaker, lower levels of education and employment, and those who were smokers and had a history of depression or anxiety were at risk (Rubertsson, Hellstrom et al. 2014).

Whilst anxiety has been found to decrease for most women after the first trimester, previous experience of miscarriage has been linked to the presence of pregnancy anxiety in the 2nd and 3rd trimesters (Woods-Giscombe, Lobel et al. 2010). Unsurprisingly, fear of foetal death was found to be a common theme in those with a history of miscarriage or stillbirth (Brockington, Macdonald et al. 2006). The number of previous miscarriages predicted depression and anxiety in the subsequent pregnancy (Robertson Blackmore, Cote -Arsenault et al. 2011).

4.1.2.3 Effects of perinatal anxiety on infant outcomes

Most studies investigating the impact of maternal anxiety have taken a dimensional perspective using general measures of anxiety such as the Spielberger State-Trait Anxiety Inventory (STAI). The impact of anxiety disorders may differ from generally elevated anxiety, as anxiety is only one of several criteria (including functional impairment and duration) required to make a specific diagnosis.

There is considerable evidence that antenatal anxiety in particular represents a risk for subsequent child development. Antenatal anxiety in primiparous mothers has been related to elevated rates of birth complications, and postnatal depression (Barnett and Parker 1986). Antenatal anxiety has been linked to more difficult temperament at 4-6 months (Davis, Snidman et al. 2004; Austin, Hadzi-Pavlovic et al. 2005)). Further, antenatal anxiety has been found to predict children's behaviour problems at 4 years (OR 1.72), with independent risk conferred by postnatal (but not antenatal) depression (O'Connor, Heron et al. 2002). The association remained even after controlling for obstetric risks, psychosocial disadvantage and postnatal anxiety and antenatal depression (O'Connor, Heron et al. 2003). However, no direct

measures of parenting were taken which might also have helped elucidate influences (Barlow 2002). Recent research has shown that the effects of antenatal anxiety on child behaviour and development are independent of depressed mood and persist throughout childhood (O'Donnell, Glover et al. 2014).

These effects have led to the proposal of a foetal 'programming hypothesis', that is to say that exposure to stress hormones (cortisol in particular) in utero leads to lasting changes in the infants neurobiology that are subsequently expressed as behavioural and affective difficulties (O'Connor, Heron et al. 2003). Some infants may be more genetically susceptible to these influences although the specific mechanisms proposed are not clear, with debate centring around the serotonin transporter polymorphism (Pluess, Velders et al. 2011; Braithwaite, Ramchandani et al. 2013).

A recent study linked the experience of more positive events in pregnancy with lower cortisol levels, suggesting that increasing positive emotions as well as decreasing negative emotions may be an important target for therapy (Pluess, Wurmser et al. 2012).

Some (Barnett and Parker 1986; Dayan, Creveuil et al. 2006; Martini, Knappe et al. 2010; Hernandez-Martinez, Val et al. 2011) but not all (Andersson, Sundström-Poromaa et al. 2004; Littleton et al 2007), studies have found a relationship between maternal anxiety and compromised obstetric outcomes such as low birth weight and early delivery. Antenatal anxiety has recently been associated with higher rates of caesarians (Paul, Downs et al. 2013).

There is little very strong or consistent evidence for a negative impact of postnatal maternal anxiety on child development, but slightly more on psychological outcomes (see Glasheen, Richardson et al. 2010 for a review). The impact of specific postnatal disorders including OCD on infant outcomes has not been described.

4.1.3 Diagnosis and detection of postnatal mental health problems

Detection of postnatal distress in mothers is an important first step. Assigning the correct diagnosis is then of paramount importance, as it should facilitate the correct management and access to treatment for individuals.

4.1.3.1 Problems with detecting perinatal anxiety

Goodman and Tyer-Viola (2010) attempted to quantify rates of detection of depression and anxiety in a community sample of women. They screened a sample of convenience of 491 women using the EPDS and anxiety items from the PHQ antenatally and 6 weeks postnatally and also asked them if they thought they needed help. Subsequently the researchers reviewed the women's medical records to ascertain what diagnoses and help had been received. 23% of participants screened positive for anxiety and depression and 17% were positive at 6 weeks. However only 15% of those that had screened positive had received treatment during pregnancy and 25% had received it postnatally (with an additional 2.5% referred for help).

Failure to detect anxiety disorders may also be a problem for those actually in contact with perinatal mental health services. Brockington noted that many

referrals are made for postnatal depression when this is not the main problem (Brockington, Macdonald et al. 2006). Battle et al found that postnatal depression was the most assigned diagnosis in a combined sample of inpatients and outpatients, comprising 86.7% of the total, with very low rates of anxiety disorder diagnosed (0.4% GAD to 4% panic) (Battle, Zlotnick et al. 2006). This data is considerably discrepant from a recent study showing high rates of anxiety disorders (GAD being the most prevalent at 49.5%) and comorbidity between depression and anxiety disorders (38.5%) of in a referred sample. Only 3.3% had pure major depression in this sample (Grigoriadis, de Camps Meschino et al. 2011). Schofield, Battle et al. (2014) reviewed the notes of 334 pregnant and postpartum women attending a 'partial hospitalization' programme, i.e. of an intensity between outpatient and inpatient; often referred to in the UK as "day hospital". They identified significant discrepancy in the symptoms identified by self report and the diagnoses ascribed to patients. The most frequently endorsed symptoms were those of GAD, described by 62.6% of women; 1.5% were given the diagnosis. Obsessions were reported by 30.2% and compulsions by 24.6% of women and 3.9% were given the diagnosis.

4.1.3.2 Misdiagnosis of perinatal anxiety

There are several factors that could contribute to the missed or incorrect diagnosis of anxiety, although these remain speculative.

Clinicians may not be cued to think of anxiety in the postnatal period. Despite widespread use of the term, postpartum depression is not considered a stand-alone diagnosis, although depression 'with postpartum onset' is a qualifier in DSM-IV and

DSM-V. Although suggested by some perinatal academic groups prior to the finalization of DSM-V, the diagnoses of mixed depression and anxiety and OCD do not have perinatal specifiers. Therefore healthcare professionals may not have these diagnoses in mind in the same way as postnatal depression when encountering distressed mothers. Diagnosing clinicians may not be familiar with the full range of perinatal diagnoses, or may work on the assumption that the presence of any depressive symptoms (rather than just the full disorder) should lead to the exclusion of other disorders, not just GAD.

The criteria for postnatal depression are the same as for depression at other times, with the addition of commonly observed symptoms such as 'mood fluctuations or mood lability and overconcern with the infant' (APA, 2000). However, these symptoms are unlikely to be specific to depression and often feature in OCD and other anxiety disorders.

In OCD there are specific factors (described above) which may lead mothers to be reluctant to identify their obsessional thoughts, so they may describe the mood effects without mentioning obsessional thinking or compulsive behaviours.

The distinction between diagnoses is particularly important in ensuring women access effective treatment. For example, the evidence base for treatments in depression indicates that it is more responsive to cognitive therapy and interpersonal therapy, whereas for OCD, CBT treatments which include exposure and response prevention (E-RP) are most effective.

Postnatal or puerperal psychosis has also been implicated as a differential diagnosis to OCD. Postnatal psychosis is not common (affecting 1/1000) and usually develops in the first few days following birth. As described above in section 2.2.5 and 2.5, the sudden onset and thoughts of harming the baby that often present as part of psychosis can appear superficially similar to the symptoms of OCD, which appears to be 300 times more common. A key differentiating feature of obsessional thoughts is that they are ego-dystonic and are not associated with thought disorder, delusions or hallucinations, even though the thoughts may be very frightening when the person is anxious.

One barrier to the diagnosis of OCD, particularly where the person is experiencing thoughts of violence or harm, is the reluctance of professionals to assess the person as low risk. Due to the anxiety and doubts associated with the disorder, the person themselves is likely to express low confidence in their own judgement which will then provoke concern in professionals. This may also lead professionals to incorrectly identify potential sources of risk. In a paper on risk management in OCD, Veale, Freeston et al. (2009) describe the importance of distinguishing 'primary' i.e. direct risk and 'secondary' risk, the harmful consequences to self and others of the disorder. Examples of primary risk in the context of perinatal OCD would be a mother acting on an intrusive thought to suffocate her child. Examples of secondary risk would be withdrawal from or avoidance of interactions with the child, excessive money and time spent on cleaning, limiting the child's physical or social activities and marital discord.

No studies have found that the presence of OCD is a direct risk factor for harm and there are no recorded or even anecdotal instances of people with OCD acting on intrusive thoughts despite significant collective clinical experience in assessing and treating OCD (Salkovskis, personal communication). Sadly, examples of secondary risk are well documented (see section 1.3 on impact and burden above).

4.1.3.3 Screening for perinatal anxiety

Although screening for depression happens on a pragmatic basis in the UK, there are problems with instigating a more widespread programme. Detection of depression via screening programmes have highlighted excessive false positives using the EPDS (Pawlby, Sharp et al. 2008; Mauri, Oppo et al. 2010). Moreover, using a single administration of the measure may particularly overestimate the prevalence of anxiety, which may be transiently elevated particularly on a first visit to hospital (Matthey and Ross-Hamid 2012). Screening only for depression is likely to miss anxiety and other disorders (Schofield, Battle et al. 2014). There is a clear need to find functional instruments for use by general perinatal professionals to detect specific diagnoses and difficulties (Brockington, Macdonald et al. 2006; Mauri, Oppo et al. 2010). Work by various authors is refining shorter measures to detect depression and general anxiety (O'Hara, Stuart et al. 2012).

4.1.3.4 Help-seeking in the perinatal period

As at other times, only a small proportion of those who have a given disorder recognise that something is wrong and even fewer seek help (Reay, Matthey et al. 2011). Low rates of help-seeking in women at risk for postnatal depression have

been associated with younger age, less education and poorer gestational outcomes (Murray, Woolgar et al. 2003; Koleva, Stuart et al. 2011)

Lack of engagement may be cultural and psychological, linking with low expectations of care and understanding from professionals (Kopelman, Moel et al. 2008). The barriers to help may be practical such as the availability of support and childcare and transport costs. Perinatal service users may desire high levels of flexibility in treatment approach including home-based therapy (Flynn, Henshaw et al. 2010). Treatment providers need to make particular efforts to address the range of obstacles to care, particularly with low income women who are the least likely to seek help (Levy and O'Hara 2010).

Little is known about levels of treatment seeking in the perinatal anxiety-disordered population. 44% of anxious women compared with 65.5% of depressed women and 71% of women with mixed anxiety and depression sought any form of help (including support from friends and partners) in one study examining this. Narrowing this to seeking help from a GP the figures were 25%, 46% and 67% respectively. In this study the most common reasons for not seeking help across groups included wanting to deal with the problem alone (27.7%), too busy (20.5%), Uncomfortable/embarassed (16.9%). Mothers also saw it as a normal part of having a baby (10.8%) with a small number expressing low confidence in health professionals (6%).The authors comment that 'help-seeking in anxiety is less than depression partly because normal and acceptable levels of anxiety are not yet fully understood' (Woolhouse, Brown et al. 2009). This may be true of service users and professionals alike.

Help-seeking may be particularly affected in the perinatal period by fear of misunderstanding and the reactions of healthcare providers. Mothers with any mental health problem may fear the instigation of child protection proceedings if symptoms are disclosed that they fear may indicate they are failing as a mother. This may be a particular problem in OCD with thoughts of deliberate harm when the symptoms appear to be expressing a high level of risk. Professional responses of alarm can mirror and reinforce the mother's own fears. Unfortunately anecdotal evidence suggests that in some cases fears of professionals misunderstanding the problem are well founded; inappropriate risk management can have significant deleterious effects on maternal symptoms and treatment (Challacombe and Wroe 2013).

4.2 Interventions for postnatal mental health problems

Interventions for postnatal mental health have tended to focus on two main streams - treatment of the maternal disorder and treatment of the interaction. A handful of studies have addressed both.

4.2.1 Treatment of the maternal disorder

Medication and psychotherapy including cognitive therapy and IPT are standard treatments for depression. These have all been shown to be efficacious treatments in themselves and during the postnatal period (O'Hara, Stuart et al. 2000; Cooper, Murray et al. 2003; Wisner, Hanusa et al. 2006). The particular circumstances of the postnatal period (mental and physical fatigue, role transition, the demands and

responsibilities of looking after a young child) need to be factored into postnatal treatments, not least in practical terms such as the scheduling of sessions around the infant's routine.

As with depression, the recommended treatments for perinatal anxiety disorders mirror treatments for anxiety at other times, although the evidence for treatment effectiveness in the perinatal period comes purely from case studies and series. Some studies have tested the effectiveness of interventions to reduce mixed depression and anxiety. Misri, Reebye et al. (2004) is the only controlled study to examine treatment of depression and comorbid anxiety disorders. However, specific anxiety comorbidity is not adequately described, termed simply 'anxiety', 'anxiety with obesssions' or 'anxiety with OCD'. One woman in the trial had depression only. In this study 35 women were randomised to Paroxetine with or without 12 sessions of individual CBT. 32 women completed the study and women in both groups improved on measures of depression, anxiety and OCD, with no significant group differences.

There are a handful of antenatal preventative interventions aimed at the reduction of postnatal depression and anxiety symptoms (Milgrom, Schembri et al. 2011). A group CBT intervention for women with mild depressive symptoms and at risk for anxiety showed no effect compared with control group, and was hampered by a 52% dropout rate (Austin, Frilingos et al. 2008). Similarly, interventions to prevent postnatal depression have not shown significant efficacy (Dennis 2005).

There are no randomised trials examining either pharmacological or psychological treatment of postnatal anxiety disorders.

There is considerable debate as to whether treatment of the maternal disorder has a direct ameliorating effect on the mother-infant relationship and thereby child symptoms. Whilst reducing maternal mood symptoms may reduce parenting stress, greater reductions have been found with targeted interventions for the mother-infant relationship (Milgrom, Ericksen et al. 2006).

The finding that current mood symptoms are stronger predictors of maternal responsiveness than past symptoms (Crockenberg and Leerkes 2003) and that chronic depression rather than depression experienced at a single timepoint is a bigger predictor of sensitivity (Kochanska and Kuczynski 1991) suggest that the proximal effect of depression might be ameliorated by treatment. However, the links between antenatal and postnatal depression and far reaching consequences such as subsequent depression and antisocial behaviour (Hay, Pawlby et al. 2003) indicates that not all the mechanisms of transmission are fully understood and that exposure to antenatal or early depression may have an impact on unfolding developmental processes.

In a recent review of the impact of treatment of parental depression on child variables, Gunlicks and Weissman (2008) reviewed ten studies of parents with children of varying ages. Five of nine studies reviewed found a beneficial effect of parental treatment on children's emotional and behavioural symptoms. However, treatment was not shown to positively affect cognitive development, attachment, temperament or emotionality. None of the studies compared the differential effect of maternal treatment by medication or psychotherapy on children.

Treatment preference is important and likely to have an impact on adherence and effectiveness. Depressed women have been found to prefer psychological therapies over pharmacological therapies (Alvidrez and Azocar 1999; Goodman 2009). Apart from the general preference usually found in this area, other influences such as concern regarding the impact of medication on the developing child pre-term and the impact on breast milk post-term may also be important considerations for both service users and professionals.

In a recent study, Arch (2013) examined hypothetical treatment preferences for anxiety in a non-clinical sample of pregnant and non-pregnant women and found a marked preference for treatment involving psychotherapy in both groups and a preference for CBT only treatments in the pregnant group (74% v 47%). The extent to which exposure therapy in pregnancy is acceptable to people with anxiety disorders is not known (Arch, Dimidjian et al. 2012). There is anecdotal evidence that therapists may hesitate in delivering exposure based treatments to pregnant clients for fear of causing harm by increasing stress or because of the tasks themselves (e.g. self contamination).

4.2.2 Interventions in the mother-infant relationship

Given the evidence of the effect of dysfunctional interactions on attachment security, a number of researchers have evaluated interventions targeted at the mother-infant relationship.

Interventions in mother-infant sensitivity have utilised video feedback (VF) methods to enhance maternal sensitivity to infant cues. According to a meta-analysis of seventy studies (including samples with maternal disorders, child disorders and samples of high risk according to socio-deomographic variables), such interventions are effective, with a pooled effect size of d=0.33 ($p<0.001$). Changes in sensitivity were related to subsequent changes in attachment status, with a combined effect size for the ten studies including that outcome of d=0.39. The analysis found that shorter, behaviourally based interventions were the most effective (Bakermans-Kranenburg, van Ijzendoorn et al. 2003). There was more mixed evidence concerning the prevention of disorganised attachment, but interventions focusing on maternal sensitivity (as opposed to representations or more general support) (d=0.24 v d=0.04), beginning after the baby was six months (d=0.23) and targeting at risk child than at risk parent ((d=0.29 v d=-0.1) populations were found to be more effective . Disorganisation can reduce as a side-effect of interventions in sensitivity, but may reduce further with targeted intervention (Bakermans-Kranenburg, Van Ijzendoorn et al. 2005).

There is some evidence that the parents own attachment state of mind may play a role in how they benefit from interactional intervention with infants. Bakermans-Kranenburg, Juffer et al. (1998) examined a short term videofeedback intervention to promote sensitivity for mothers with insecure representations, with or without discussions aimed to help with their own early attachment experiences. Participants who were classified as insecure-dismissing tended to profit most from VF, while those who were classified as insecure-preoccupied tended to profit most

from VF with additional discussions about their childhood attachment experiences. Cassidy and colleagues found that secure mothers were more able to benefit from an intervention to enhance sensitivity with irritable infants (Cassidy, Woodhouse et al. 2011).

Therapeutic interventions including video-feedback can help enhance sensitivity in mothers even with very severe mental illness (Kenny, Conroy et al. 2013). A meta-analysis of interventions to enhance sensitivity in depression found individual therapy to be ineffective while interventions including baby massage were moderately effective (Kersten-Alvarez, Hosman et al. 2011). Targeted video feedback has been used with mothers with eating disorders to reduce episodes of mealtime conflict (Stein, Woolley et al. 2006). However it is unclear whether these effects are maintained over time.

Klein Velderman, Bakermans-Kranenburg et al. (2006) found that a video feedback intervention to enhance sensitivity was more effective for mothers with highly reactive infant, suggesting a minimum level of interference may be necessary to demonstrate an effect.

No studies have targeted treatment of the mother infant relationship in the context of maternal anxiety disorders.

4.3 Treatment of postnatal OCD

Measurement of treatment success has varied in studies, with suggestions of between a 30% and 50% reduction on the YBOCS representing clinically significant change (Misri and Milis 2004; Tolin, Abramowitz et al. 2005). Tolin, et al. (2005)

examined YBOCS change scores and compared them with the Clinical Global Impressions scale. They concluded that a 30% change on the YBOCs represented clinically significant change, detectable by changes on the CGI. (Abramowitz, Tolin et al. 2005) also found the OCI-R to be a useful measure of change.

Complete remission in clinical studies of any type is rare. Those treated with CBT generally still remain more symptomatic overall than the general population (Abramowitz 1998).

4.3.1 Pharmacological treatments for OCD

SSRIs are recommended in the UK by NICE as an effective treatment for OCD (NICE guideline CG31, 2005). SSRIs produce comparable symptom reduction to cognitive therapy and exposure therapy (Abramowitz 1997), although 50-60% of people do not respond (Goodman, Price et al. 1989) and relapse rates upon discontinuation are high (Fineberg, Reghunandanan et al. 2013). Antipsychotic augmentation has been recommended for treatment refractory OCD (defined as non response to medication and CBT) although the efficacy is far from clear, particularly when compared with CBT (Matsunaga, Nagata et al. 2009; Simpson, Foa et al. 2013), with the latter well conducted study showing no difference from placebo, and CBT having a very large effect size.

Although clinical trials of medication purposefully exclude pregnant and breastfeeding women, in clinical practice SSRIs are widely offered to this group. However, this may not be an acceptable intervention for pregnant or breastfeeding women given the lack of evidence as to their long term safety. Although there are

short term effects on the infant such as withdrawal reactions, respiratory distress, feeding problems and irritability, they are thought to be transient (Oberlander, Misri et al. 2004). However, long term follow up data is sparse (Nordeng, Spigset et al. 2005). Side-effects for mothers can include grogginess, fatigue, insomnia, headache, heartburn, dry mouth and anorgasmia (Arnold 1999; Misri and Milis 2004).

A single very small study found SSRI use in pregnancy by depressed mothers to be linked to disorganised attachment in 4 of the 5 dyads studied (Troutman and Momany 2012). This study is very small and preliminary but the results could suggest that SSRIs may disrupt the normal processes of tuning to infant distress that can also be compromised by depression. This study highlights the importance of looking more widely than infant physiological reactions in the study of the effects of SSRI use by pregnant and breastfeeding women.

The case is often made for balancing any negative side-effects of pharmacological treatment against the negative effects of the untreated disorder. This analysis often fails to consider the option of psychological therapy (Dimidjian and O'Hara 2009).

4.3.2 Cognitive behaviour therapy (CBT) for OCD

Cognitive behaviour therapy (CBT) has become one of the main lines of treatment for OCD. It is has been shown to be effective in a number of studies (Nakatani, Nakagawa et al. 2005; Olatunji, Davis et al. 2013; Simpson, Foa et al. 2013) with a recent meta-analysis estimating post treatment effect sizes of 1.39 (Hedges g) and

follow up of 0.4 (Hedges g) (Olatunji, Davis et al. 2013). It is recommended in the UK by NICE as an effective treatment for OCD (NICE guideline CG31, 2005).

In the United States, exposure and response prevention (ERP) is the most utilised and therefore most researched treatment approach. Several studies have shown that exposure and response prevention is efficacious and is equivalent or superior to Clomipramine or combined therapy e.g. (Franklin, Abramowitz et al. 2002). CBT has been found to achieve slightly better improvement and recovery rates than ERP (Whittal, Thordarson et al. 2005), although the same has not been shown for the addition of 'cognitive elements' to ERP (Vogel, Stiles et al. 2004; Abramowitz, Taylor et al. 2005).

Unlike medication, CBT is a treatment involving active participation. CBT can only work if the person is able to access and attend sessions and complete experiments and homework tasks between sessions (Abramowitz, Franklin et al. 2002). CBT completion has been shown to lead to better outcomes and lower relapse rates (Whittal, Robichaud et al. 2008; Simpson, Marcus et al. 2012), but in routine practice few may receive the input of 12 weekly sessions described in most trials (Mancebo, Eisen et al. 2006).

As mentioned earlier, dropout rates for CBT are high, reported at 51% in one study (Santana, Fontenelle et al. 2013). The only study comparing ERP and CBT found that CBT may have slightly better dropout rates (4/37 v 8/38), but dropout in this study in both groups was small (Whittal, Robichaud et al. 2008).

CBT has been found effective for all presentations of OCD. Those with obsessions related to responsibility for harm in particular may do well with CBT, with hoarding being the least amenable to standard treatment (Mataix-Cols, Marks et al. 2002; Abramowitz, Franklin et al. 2003; Eisen, Sibrava et al. 2013). However, for those with violent obsessions, engaging with or approaching treatment may be particularly difficult and this symptom dimension has been associated with treatment refusal (Santana, Fontenelle et al. 2013).

CBT may be a good choice for women in the perinatal period due to particular concerns about the effects of psychotropic medication on the developing foetus or infant via breastmilk (Pearlstein, Zlotnick et al. 2006; Arch 2013). Although concern is sometimes expressed by clinicians and patients of the impact of exposure based (and therefore temporarily anxiety-elevating) treatments on the unborn child, there have been no reports of negative effects, although there are no studies examining this (Arch, Dimidjian et al. 2012). Such concern may not take into account the fact that given the presenting problem, levels of anxiety are already high.

4.3.2.1 Intensive delivery of CBT

Traditionally, CBT has been delivered in approximately one hour long weekly sessions for reasons of general historical precedence and convenience.

However, more recently, this format has been tweaked to find out if comparable outcomes can be achieved in a shorter time with more intensive delivery. Equivalence of outcome has been found between intensive daily delivery and twice-weekly (Abramowitz, Foa et al. 2003) or weekly sessions (Storch, Merlo et al. 2008).

However at follow up, there was increased relapse for those in the intensive treatment group. In the UK comparable results were found between weekly and intensively delivered treatment (Oldfield, Salkovskis et al. 2011). Although clinical results are promising, there have not as yet been any randomised trials comparing intensive treatment with other formats, not least because of the numbers needed for such studies.

Intensively delivered CBT has been found to be acceptable to participants (Bevan, Oldfield et al. 2010). Home based delivery of CBT has been shown to be as effective as office based (Rowa, Antony et al. 2007). These findings suggest that traditional delivery of therapy could be tailored to meet the needs of particular groups without loss of effectiveness. Mothers of small children would be obvious beneficiaries of such modifications.

4.3.3 Interventions for postnatal OCD

Evidence for intervention in postnatal OCD comes exclusively from case studies and small case series, few of which provide standardised measures. Given the direct relevance to the current study, these papers will be described here.

Taking the pharmacological studies first, SSRIs have been used in several studies for women with postnatally occurring OCD usually with fears of contamination or fears of deliberate harm. However, the SSRI is often administered in combination with other medication and therapy. (Sichel, Cohen et al. 1993a) reported treatment success with two women experiencing intrusive thoughts of harm, once with postnatal onset and the other with a three year history. However, no measures are

reported and it is noted that an attempt to reduce the dose in one patient led to relapse of symptoms. A larger case series reported by the same authors examined 15 cases of postnatally occurring OCD via retrospective notes review. Participants received twelve weeks of pharmacological intervention (consisting of various tricyclic antidepressants, fluoxetine, clomipramine or a combination of these agents). One patient also received ECT. When followed up at one year 4/15 patients had achieved full remission of symptoms while the other 11 had residual symptoms (rated at 2-3 on the CGI). These symptoms were persistent at one year follow up when all but one mother had remained on medication, with symptoms resurging for 2/3 who had attempted to discontinue medication (Sichel, Cohen et al. 1993).

Arnold (1999) reports a case series of seven women with postnatal onset OCD, although four had onset after a previous pregnancy, indicating more longstanding difficulties. There was significant comorbidity of mood (100%) and anxiety disorders in the group as well as history of unsuccessful treatments. Three of the sample agreed to be treated with fluvoxamine over twelve weeks (the rest refused as they wished to continue breastfeeding). This was described as 'successful' in two of the three cases with YBOCS scores reducing from 9 to 5 and 17 to 10.

More recently Misri and Milis (2004) conducted a study of Quetiapine augmentation for women with 'treatment resistant' postnatal OCD (defined as non response after 12 weeks of SSRI/SNRI). Data were reported for the 14 women of 22 who completed the trial (three withdrew due to side effects and five refused). 6 women had a new onset after the current pregnancy, with the rest having longstanding OCD or onset after a previous pregnancy. All mothers had a

concurrent diagnosis of postnatal depression. After three months 11/14 women responded fully (50% reduction on YBOCS scores). The definition of treatment resistance here is less stringent than the generally accepted definition of treatment resistance which includes both pharmacotherapy and psychological therapy. In addition there was no control condition to determine if an additional three months of SSRI alone would have produced a similar effect.

A handful of studies report on combined therapy, although the psychological therapy administered is minimally described. Buttolph and Holland (1990) include four case reports with outcome data who were treated using either an SSRI or combined with behaviour therapy over 3-10 months. YBOCS scores reduced in all cases.

Hudak and Wisner (2012) describe a woman with intrusive thoughts of harm treated with Citalopram 40mg per day and an 'OCD program' including ERP for 2 days a week for twelve weeks. They report improvements (without any specific measures), but increased the dose of Citalopram to 80mg which continued after ERP ended. At two year follow up the woman is reported to have been experiencing residual thoughts and Citalopram was then continued for 5 years.

In terms of evaluating psychological therapy for postnatal OCD the published evidence is very scant. Abramowitz, Moore et al. (2001) report on the successful treatment of four fathers with postnatal OCD using ERP, although no standardised measures are reported. It is mentioned that one father had an unsatisfactory response with SSRIs prior to CBT but it is not stated if he remained on medication.

Christian and Storch (2009) describe in detail the cognitive behavioural treatment of a woman with postnatal onset OCD treated with 8 sessions of CBT, in which her YBOCS score reduced from 22 to 6 over a three month period. However, a relapse was reported after a further three months and the woman was then treated successfully (i.e. scores returned to the end of treatment level) with three further sessions.

Challacombe and Salkovskis (2011) report on the treatment of a consecutive series of 6 women with intensively delivered CBT (comprising twelve hours over two weeks), delivered in the participants home where possible (in 4/6 cases). All women showed some improvement with an average reduction on the YBOCS of 19 points after two weeks which was maintained at 1-3 month follow up. The intensive and predominantly home based CBT was rated as highly acceptable to mothers and helpful for parenting, although parenting data was not systematically collected.

The evidence for effective treatments specifically in postnatal OCD remains limited, with non-response and relapse following discontinuation prominent, particularly in pharmacological interventions.

There are no controlled studies of intervention for women with clinical postnatal OCD.

Study lead authors (year)	**Sample size**	**Sample characteristics**	**Treatment**	**Outcome**		
				outcome measure	Pre	Post[$]
Buttolph & Holland (1990)	4	Case reports of women with perinatal OCD (not necessarily PN onset) attending perinatal clinic	Fluoxetine only (n=1) or Fluoxetine with 3 (n=2) or 10 (n=1) months of behavior therapy	YBOCS Mean YBOCS	35 17 31 11 23.5	20 9 10 5 11
Sichel, Cohen et al (1993)	15	Women with postnatal OCD attending perinatal clinic identified via retrospective chart review.	Mixed pharmacotherapy approach including: Fluoxetine (12/15), Desipramine (2/15), Clomipramine (4/12). ECT (1/12)	Mean CGI (general functioning ; not OCD specific)	5.8	2.1
Arnold (1999)	3	Women recruited via advert with PN onset OCD (but 1 began in previous pregnancy) Comorbid depression & anxiety	Fluvoxamine over 12 weeks	YBOCS Mean YBOCS	19 9 17 15	21 4 10 11.7
Christian & Storch (2009)	1	Woman attending OCD clinic with PN onset	8 sessions of CBT over 3 months. On stable SSRI	YBOCS	22	6

Misri & Milis (2004)	17 (14 completed trial)	Women attending perinatal clinic. Non-responders to 8 weeks of SSRI/SNRI (not necessarily PN onset)	Quetiapine augmentation of SSRI for 12 weeks	Mean YBOCS (n=14)	24.7	10.2	
Challacombe & Salkovskis (2011)	6	Women recruited by advert. Consecutive series of women with PN OCD (not necessarily PN onset)	12 hours of CBT over 2 weeks + follow up at 1 month 3/6 on stable SSRI	Mean YBOCS	25.1	6.2	CGI=Clinical global impression

(1=not at all ill, 2= borderline ill 3= mildly ill, 4=moderately ill, 5=markedly ill, 6 severely ill, 7=amongst the most ill patients I have seen); YBOCS = Yale-Brown obsessive-compulsive scale.

$: The timing of post treatment information varied considerably across studies and is mostly provided at follow up 3 months after the end of treatment.

Table 6: summary of treatment studies for postnatal OCD which provide outcome measures

4.4 Conclusions from Chapter 4

- *There is growing evidence not only of the high prevalence of anxiety disorders in the postnatal period, but of the fact that they are often undiagnosed and untreated. Given the levels of distress experienced by sufferers and the potential interference in parenting, this represents a significant clinical problem.*
- *Whilst interventions in depression are building up a clear evidence base, there is a paucity of treatments directed at postnatal anxiety and there are no randomised trials.*
- *CBT appears to be effective and acceptable for postnatal OCD. The effect of treatment in alleviating not only maternal symptoms but also any secondary effect of improving parenting is not known.*

4.5 Overall conclusions from chapters 1-4

- *OCD is a potentially severe and disabling disorder that can be triggered or exacerbated by the experience of childbirth.*
- *Research has identified probable cognitive vulnerability factors for the development of OCD. However, it is not yet known if it is possible to identify mothers at risk of developing clinical levels of symptoms using antenatal screening in a community sample.*

- *Further, there has not yet been a study that has followed up a high risk community sample to examine the course of obsessional symptoms over the postnatal year, comparing them with a concurrently recruited low risk control group.*
- *Although the parenting of anxious parents has been investigated, no research has specifically investigated mother-infant interactions in mothers with OCD. This is particularly striking as the case literature contains several examples of direct interference in parenting behaviour from the disorder.*
- *The impact on general parenting style, perceptions of parenting and attachment in postnatal OCD has not been studied. Mothers with OCD have not been compared with healthy control mothers on general parenting variables.*
- *Finally, although CBT is effective for OCD, no controlled trial has examined this in the postnatal period. Further, the impact on parenting variables is unexplored.*

4.5.1 Research questions and hypotheses

1. What happens to levels of obsessional symptoms in women identified as high risk and those identified as low risk from ante- to postnatal?
2. What is the impact of clinical OCD on parenting, relationships and infants?
3. Can CBT treatment be rapidly effective for this group?
4. Is any negative impact on parenting ameliorated by treatment?

4.5.2 Specific hypotheses

1. In light of the findings that OCD can be triggered or exacerbated by childbirth and that cognitive factors may distinguish those at risk (Abramowitz, Khandker et al. 2006) it was hypothesised that **mothers scoring highly on the antenatal OC measures will develop more symptomatology postnatally than the comparison group of low scorers.**

2. Given differences in sensitivity identified in studies of anxious mothers, and the high levels of preoccupation and daily interference in everyday tasks that characterize OCD, it was hypothesized that **mothers with symptoms of OCD will exhibit less sensitive interactions (as defined by Ainsworth, see above) at 6 months with their children than those without anxiety.**

3. **Study 2: Mothers receiving immediate treatment will exhibit improvements in psychopathology greater than waiting list controls by 12 month assessment.**
4. As it is predicted that effective treatment will assuage symptoms and parenting difficulties at a key time, it is predicted that **mothers with untreated OCD symptoms will have a greater proportion of insecurely attached children as assessed by the Strange Situation Procedure (SSP) than those without.**

5. **Study 2: At 12 months, dyads where mothers are successfully treated will show higher levels of maternal self-efficacy than those where mothers are not treated.**

5. Method

5.1 Ethical Approval

Ethical approval for the study was granted by the Lewisham Research Ethics Committee (REC reference 08/H0810/18).

R&D approval was granted by SLAM (Reference 2008/039), St Thomas hospital (Reference RJ1/08/180) and Kings College Hospital (Reference 08WH07) and South London Primary Care (Reference RDLSLGBB 429).

5.2 Overall design and analytic plan

The study was longitudinal in design with two complementary arms to allow for investigation of several aspects of the nature and course of obsessional symptoms in community and clinical groups. In study 1, a community sample of pregnant mothers was recruited who completed a brief screening measure. Mothers scoring above a predetermined threshold of 95th percentile ('high risk') and those scoring below 50th percentile ('low risk') on either of two subscales from a screening questionnaire were recruited from this sample. All participants were assessed in

detail antenatally and at two postnatal timepoints (6m and 12m) using a range of methods including self-report, clinical interview and observational measures.

In study 2 a clinical group of mothers with postnatal OCD was recruited before the baby was six months old and assessed using the same methodology. This allowed examination of the effect of postnatal obsessive compulsive symptomatology on parenting variables. Following the six month assessment, mothers with OCD were randomized into immediate treatment intensive cognitive-behaviour therapy (CBT) or waitlist/treatment as usual (TAU) and all mothers were reassessed at 12 months using the same methodology. Mother infant attachment was also assessed at twelve months.

5.2.1 Power calculations

Power calculations were made using the NQuery advisor programme version 4.

1. Mothers scoring highly on the antenatal OC measures will develop more symptomatology postnatally than the comparison group of low scorers.

In the community longitudinal study, the aim was to detect group differences at the two postnatal points. The primary outcome measure for postpartum obsessional symptomatology was the OCI. Given that the two groups in Study 1 were likely to differ at the 7m antenatal assessment, as well as showing a predicted difference postnatally, change over time was the dependent variable. A seven-point difference on the OCI would be regarded by experts in the field as clinically meaningful. From previous studies with comparable groups, this would be approximately half of one standard deviation for this measure at post-treatment in clinical groups and a full

standard deviation for healthy controls (Challacombe and Salkovskis 2011). A change of 2/3 of a standard deviation represents an effect size of 0.6. The study was powered at 0.85 and the alpha was set at 0.05. This means that 41 participants were required in each group in order to detect a difference of this size.

2. Mothers with symptoms of OCD will exhibit less sensitive interactions (as defined by Ainsworth, see above) at 6 months with their children than those without anxiety.

Maternal sensitivity was defined using an overall score from 1-9 based on the use of Ainsworth's sensitivity scale adapted for use in a non-clinical study of mothers with anxiety (Nicol-Harper, Harvey et al. 2007). Based on reported means and standard deviations in this study, two groups of 51 were required to detect a difference, powered at 0.85 with an alpha of 0.05.

3. Study 2: Mothers receiving intensive CBT following the assessment at six months will exhibit improvements in psychopathology greater than waiting list controls by 12 month assessment.

In terms of the expected improvement in obsessional symptoms following treatment for OCD, uncontrolled effect sizes (Cohen's d) would be approximately 1.79-2.01 on the OCI (Challacombe and Salkovskis 2011). We assumed that we would obtain the minimum of 1.5. This means that the sample size specified for the maternal self-efficacy measure was adequate and powers this component of the

study to better than 0.99. Study 2 was powered on the self-efficacy measure (hypothesis 5 below) as we anticipated a smaller effect size for that measure (0.8).

4. Study 1 & 2: Mothers with untreated OCD symptoms will have a greater proportion of insecurely attached children as assessed by the Strange Situation Procedure (SSP) than those without.

This hypothesis was tested by taking women diagnosed with OCD at 6m postnatally (untreated women from s2 and women diagnosed with clinical OCD at twelve months in study 1) and comparing them with women without a diagnosis of OCD. We estimated we would have 35 women with OCD (30 from untreated clinical group + 5 high risk) and 40 without OCD (predicting that one person would gain a diagnosis).

Approximately 40% of infants in community samples are classified as insecurely attached. This compares with 80% in a high-risk sample of mothers with anxiety disorders (Manassis, Bradley et al. 1994). Based on the assumption that there would be similar proportions of insecurely attached infants in this study, using a significant alpha of 0.05 and a power of 0.85, to detect differences using a chi-square test, the OCD group required 33 participants and the non-OCD group 28 participants.

5. Study 2: At 12 months, dyads where mothers are successfully treated will show higher levels of maternal self-efficacy than those where mothers are not treated.

Published standard deviations for the self-efficacy measures are 11 in a non-clinical group (Porter and Hsu 2003); we estimated that it would be higher in our clinical group, and conservatively that it would be 18. On the basis of that assumption, with a power of 0.85 and alpha set at 0.05, 30 mothers per cell would allow the detection of a difference of sixteen scale points (that is, an average of one point difference per item on the scale) using t tests. This represents an effect size of 0.8.

5.2.2 Treatment of data

ANOVAs, t-tests, Fisher's exact test were used as appropriate. Where repeated measures were reported, an allowance was made for serial dependency when the Epsilon coefficient was found to be significant. In such instances, the Greenhouse-Geisser probabilities and degrees of freedom are reported.

Data analysis was carried out using IBM SPSS version 21.

5.2.2.1 Treatment of missing data

Questionnaire data was entered manually. Missing values on established (i.e validated) questionnaires were replaced with imputed means using SPSS.

No missing data was imputed on the screening questionnaire given the brevity of the instrument. In the detailed studies, where a questionnaire or subscale consisted of less than 8 items (e.g. OCI doubt comprises three), no missing items were permitted and the scale or subscale was not used for analysis. If the subscale consisted of at least 8 items, up to two missing items were permitted for data imputation. Participant data was coded as missing where there was missing video

data (Study 2; n=1) or in the case where entire packs/datapoints were missing (Study 1; n=2).

% of missing data is reported below (broken down by group).

		Study 1: Follow up study % items missing			**Study 2: Clinical group % items missing**	
Measure	**N items**	**AN N=49**	**6m N=47**	**12m N=47**	**6m N=34**	**12m N=34**
DASS	**42**	2	4.2	2	0.1	0.1
OCI	**42**	0.1	4.4	0	0	0
RAS	**26**	0	4.3	0.2	0.2	0.1
GRIMS*	**28**	8.7	9.0	5	0.4	1.1
SEQ	**16**	6	4	2	0	0.1
Social Support	**11**	2	4.4	0.2	0.3	0.3
PAAQ	**60**	n/a	4.7	2	0.3	0
Bates	**28**	n/a	4.3	0	0	0

*not completed by some mothers as they did not have a partner; total includes these mothers

Table 7: Missing questionnaire data shown as a percentage of items missing from each measure at each assessment point.

Very few items were missing in each data set, with almost complete questionnaire data for the clinical group. Missing items could therefore be imputed to generate subscale and measure totals in most cases.

5.3 Piloting and development

5.3.1 Development of the screening questionnaire

The screening questionnaire aimed to detect (a) distress linked to existing obsessive symptomatology and (b) raised levels of a cognitive factor associated with the development of OCD (Abramowitz, Khandker et al. 2006). The questionnaire therefore comprised items concerning obsessive behaviour and beliefs about responsibility. Symptom questions were derived from the Obsessive compulsive Inventory; OCI (Foa, Kozak et al. 1998) and responsibility items were taken from the Responsibility attitudes scale, (RAS ;Salkovskis, Wroe et al. 2000). The OCI is a 42 item questionnaire requiring respondents to rate how distressed they have been by the given symptom over the past month on a scale of 0-4. The RAS is a 26 item questionnaire asking the extent to which the respondent agrees or disagrees with the statement concerning responsibility (further details of these questionnaires are given below in section 5.5.1

An existing database of OCIs and RASs (Salkovskis, unpublished data) completed by 53 people with OCD, 48 with other anxiety disorders and 191 healthy controls was interrogated for those items with (a) the highest item-total correlations and in the case of the OCI (b) theoretical relevance to the population in question, in which concerns regarding contamination, checking and intrusive thoughts of harm have been found to be most prevalent (Abramowitz, Schwartz et al. 2003). For example, OCI-R items regarding neutralising by counting were not found to be relevant in a perinatal population in terms of neutralising thoughts of harm about the baby

(Abramowitz, Khandker et al. 2006).

OCI Item	Sub-scale	Item-total correlation	Item-total rank (unrotated)	OCD only	Anxious control
7.I check things more often than necessary	Checking	0.75	4	0.58	0.74
21. I am excessively concerned about cleanliness	Washing	0.68	9	0.65	0.36
28.I find it difficult to control my own thoughts.	Obsessions	0.69	12	0.43	0.6
29.I have to do things over and over again until it feels right	Checking	0.84	1	0.72	0.7
30.I am upset by unpleasant thoughts that come into my mind against my will.	Obsessions	0.72	8	0.36	0.62
33.I frequently get nasty thoughts and have difficulty in getting rid of them	Obsessions	0.66	18	0.28	0.4
36.I feel that I must repeat certain words or phrases in my mind in order to wipe out bad thoughts, feelings or actions.	Neutralising	0.65	19	0.22	0.62
41.Even when I do something very carefully I feel that it is not quite right.	Doubting	0.77	3	0.58	0.72
37.After I have done things, I have persistent doubts about whether I really did them	Doubting	0.77	2	0.59	0.73
38.I sometimes have to wash and clean myself just because I feel contaminated.	Washing	0.57	23	0.60	0.43

Table 8: OCI item-total correlations in OCD sample to generate screening items

For the RAS, the five items with the highest item-total correlations were selected from the total database as reported below.

RAS item	Item-total correlation
I must always think through the consequences of even the smallest actions.	0.70
To me, not acting where disaster is a slight possibility is as bad as making that disaster happen	0.66
Once I think it is possible that I have caused harm, I can't forgive myself.	0.74
I have to make sure other people are protected from all of the consequences of things I do	0.66
If I cannot be certain I am blameless, I feel that I am to blame	0.72

Table 9: RAS item-total correlations in the OCD sample to generate screening items

Basic demographic data was also collected (maternal age, whether a first time parent or not, gender of child (if known). In order to maximise uptake, the questionnaire was restricted to a single page (15 questions plus basic demographic information).

5.3.2 Convergent validity of the screening questionnaire

The screening questionnaire was compared with the full OCI to establish whether the items taken out of context had broadly similar characteristics.

The screening questionnaire and the OCI were completed contemporaneously by 36 nonclinical participants, drawn from samples of convenience.

	Screening OCI total	Screening RAS total	OCI total
Screening OCI total	1		
Screening RAS total	0.324	1	
Full OCI total	0.863**	0.390*	1

Table 10: Full OCI and screening OCI total correlations in convergent validity sample

Screening OCI Item	**Range (of possible 0-4)**	**Correlation with full OCI total****
7.I check things more often than necessary	0-3	0.499
21. I am excessively concerned about cleanliness	0-3	0.689
28.I find it difficult to control my own thoughts.	0-4	0.747
29.I have to do things over and over again until it feels right	0-3	0.545
30.I am upset by unpleasant thoughts that come into my mind against my will.	0-4	0.769
33.I frequently get nasty thoughts and have difficulty in getting rid of them	0-3	0.632
36.I feel that I must repeat certain words or phrases in my mind in order to wipe out bad thoughts, feelings or actions.	0-3	0.688
41.Even when I do something very carefully I feel that it is not quite right.	0-3	0.549
37.After I have done things, I have persistent doubts about whether I really did them	0-3	0.704
38.I sometimes have to wash and clean myself just because I feel contaminated.	0-3	0.747

** all significant at p<0.01 level

Table 11: Item total correlations for screening and full OCI in convergent validity sample

The OCI items selected therefore captured a range of responding and were all highly correlated with the full OCI.

5.3.3 Piloting of the screening questionnaire

The questionnaire was piloted by collecting preliminary data in general hospital sonography clinics. The questionnaire was piloted within the clinics for readability and time to complete (approximately 3-5 minutes). This did not reveal any difficulties and questionnaires were distributed unchanged. It was also possible for most participants to complete their questionnaire while awaiting their appointment, thereby maximizing uptake and minimizing the need for participants to take the questionnaire home to complete.

The first 200 consecutive questionnaires that were returned without any missing data from either of the two recruitment sites were analysed to determine the psychometric properties of the questionnaire and to ascertain cut off points for inclusion into the follow up study. This sample comprised 174 questionnaires from St Thomas' Hospital and 36 from Kings College Hospital, the proportions reflecting the number of sessions held in each hospital.

Preliminary analysis indicated a normal distribution of RAS items, with OCI items being positively skewed (as predicted).

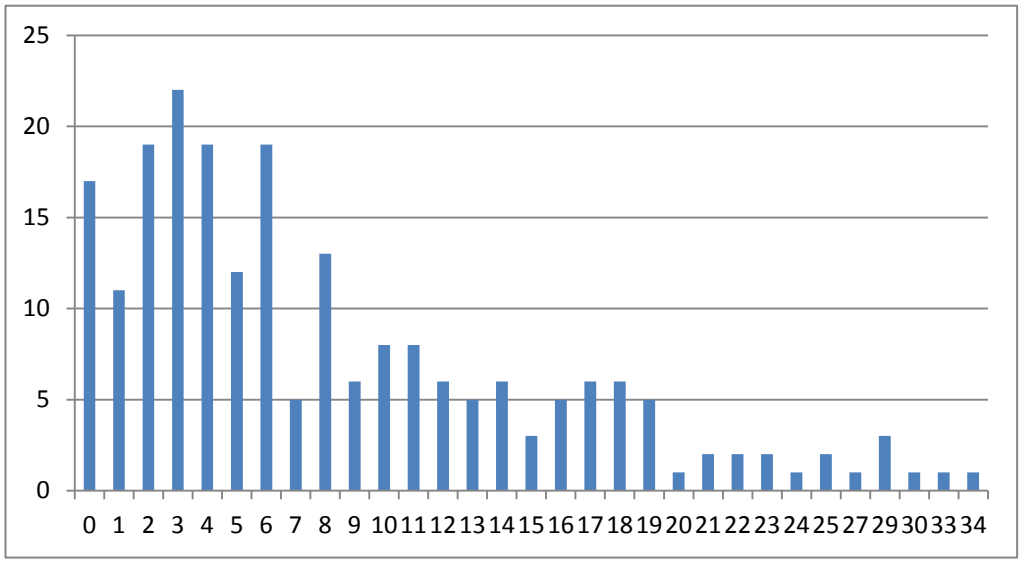


Figure 2: Distribution of OCI item-total scores in first 200 screening questionnaires

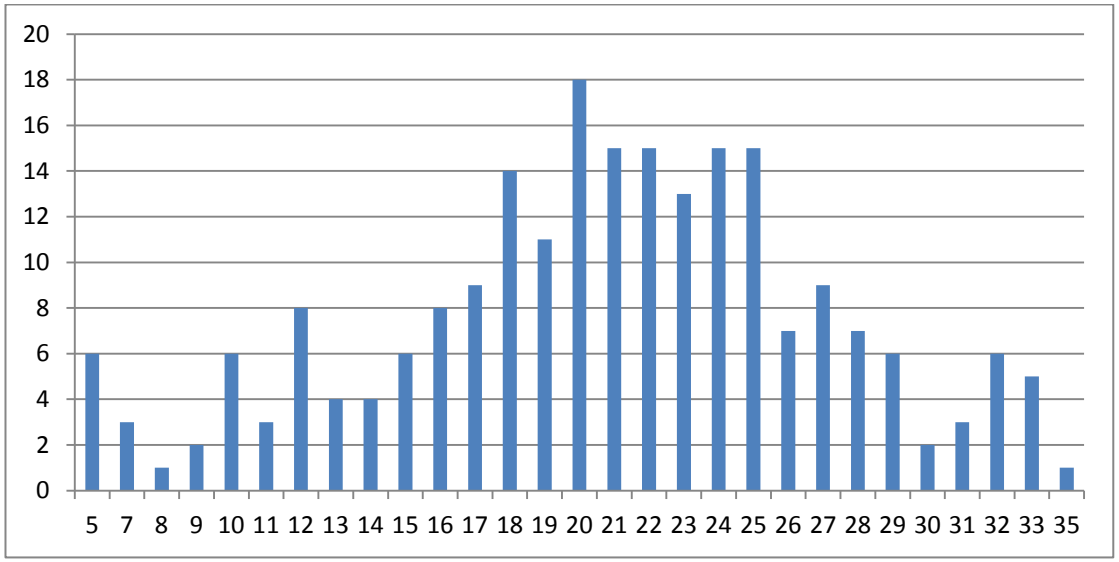


Figure 3: Distribution of RAS scores in first 200 screening questionnaires

Cronbach's alpha for OCI items was 0.89 and for RAS items was 0.85, indicating good internal consistency for both subscales. The correlation between the scales using Spearmans rho was 0.47 ($p<0.0001$.)

Establishment of screening cutoffs for inclusion into follow up study

The cutoff for high scoring OCI, RAS and combined Z scores was predetermined as the 95th percentile. Absolute scores are shown below.

Items	Mean	sd	95th centile threshold score
OCI	8.51	7.43	23
RAS	20.42	6.52	31
OCI & RAS combined (z scores)	-0.01	1.74	3.03

Table 12: Screening cutoff for high risk OCI, RAS and combined scores

Cutpoints for lower percentile bands were as given below.

Items	**1 (10)**	**2 (20)**	**3 (30)**	**4 (40)**	**5 (50)**
OCI score	1	2	3	5	6
RAS score	11	15	18	19.4	21
OCI & RAS combined (z scores)	-2.20	-1.31	-0.92	-0.63	-0.22

Table 13: Screening cutoff bandings for low risk cases

In this sample of 200, there were 9 questionnaires completed that fell above the 95th percentile for the OCI items, and 11 above the 95th percentile for the RAS items.

Although there was some overlap between high scorers on these scales, the scales measure distinct constructs of symptoms and beliefs.

The combined score was included for those who were subthreshold on both measures, indicating a high level of risk.

As part of pilot investigations four high scorers (above 95th percentile on OCI items from the preliminary screening database) were contacted informally in order to explore symptoms and confirm the validity of the questionnaire. All the women verbally reported obsessional symptomatology that was causing significant concern. For example where they had endorsed the item "I am bothered by thoughts that keep coming back" they were asked to give examples of those thoughts. Examples given were contamination of the baby via the family dog and accidental harm coming to the baby.

Following piloting, high scorers on either the symptomatic measure (OCI) or the belief measure (RAS) were invited to participate in the detailed study (known as Study 1).

5.3.4 Piloting of assessments and treatments for study 1 and 2

Assessment measures were piloted with one non-clinical participant with a baby of six months to establish the length of time for an assessment, readability and acceptability of questionnaires. Small amendments to wording of some demographic variables were made on the basis of this piloting.

The assessments and treatment for the clinical part of the study were piloted on a case series of six mothers with OCD. The treatment was rated by participants as highly acceptable (mean rating 9/10), helpful with the symptoms of OCD (mean rating 9.6/10) and parenting (mean rating 8.8) (Challacombe and Salkovskis 2011).

5.4 Study Procedures

5.4.1 Procedure for the screening study

Participants were attendees at routine antenatal scans (at between 3-8 months gestation), at two London teaching hospitals, Kings College Hospital and St Thomas' Hospital.

At each session for which the researchers were in the clinic, all mothers and partners if present were approached in the waiting room and asked for permission to inform them about the study. If, having approached them, it was apparent that mothers did not have adequate English to participate, or that they did not wish to discuss the study, the researcher thanked them and withdrew (collecting information on the number of people for whom this was the case). If permission to proceed was granted, the researcher described the study and if this was acceptable, gave the participants the questionnaire and consent form. Mothers and partners were able to consent or refuse independently; no partners choose to take part if the mother had refused. However, mothers frequently took part even if their partner did not wish to. The questionnaire was either completed in the waiting room or at home if preferred (with a freepost envelope provided to return the questionnaire). The researcher remained present to answer any questions the participants had. A

team of researchers attended clinics wherever possible (at least weekly) over a period of 36 months.

Permission was obtained to contact the participants at around four months postnatally with an identical questionnaire. In order to be sensitive to possible adverse events during pregnancy and postnatally, mothers were asked to provide GP details so that a letter could be sent asking for clearance to contact them with the postnatal questionnaire. It was considered important to establish that there had been no significant problems with the birth, in order to avoid any additional distress by contacting the participant in those circumstances.

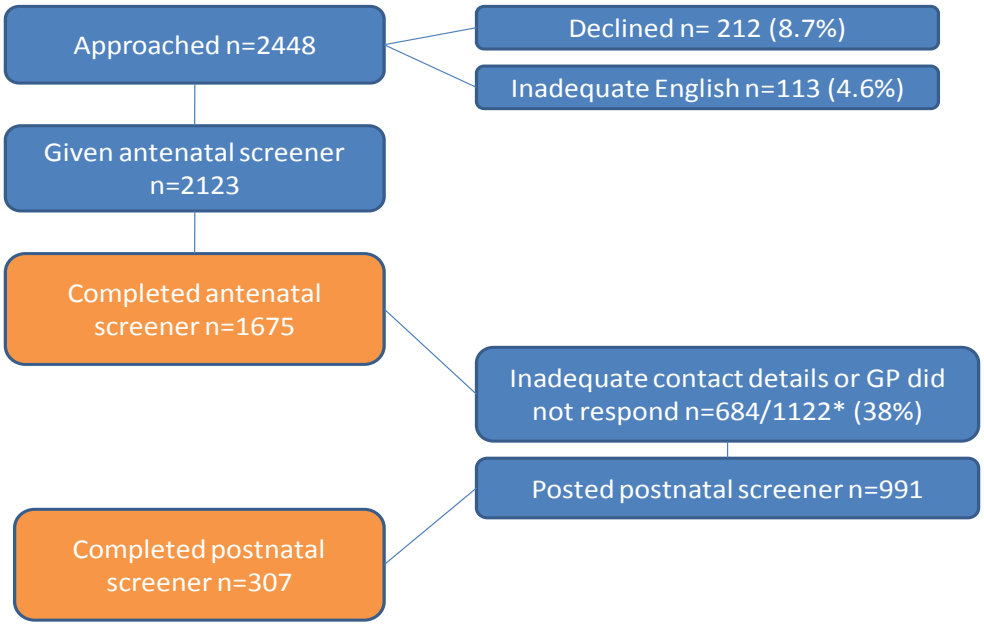
If no reply was received from the GP, or a reply was received indicating an adverse outcome then no postnatal questionnaire was sent. However, after several months the protocol was amended (with formal ethical approval) to opt into contact with GP, as participants occasionally did not wish to provide GP details and many GPs did not respond to enquiries leading to low numbers of postnatal questionnaires being sent out. This improved response rates. The postnatal measure was also sent to all partners who had completed an antenatal questionnaire.

5.4.2 Screening sample description

Antenatal questionnaires were distributed over a total of 161 morning or afternoon clinics between 2008 and 2011. All mothers attending the particular session were approached. Overall, 2448 mothers were approached to complete a questionnaire. At the point of consenting to the brief screening study, 212 (8.7%) mothers declined to take part, with 113 (4.6%) unable to take part due to inadequate English

language. The remaining questionnaires were taken but not returned (11.1%). Therefore 2123 questionnaires were distributed; 1675 of these were returned giving a 78.9% return rate and 68.4% overall takeup rate. Partners were only given questionnaires if present and if the mother had consented to take part. Therefore distribution of partner questionnaires was more erratic.

307 maternal postnatal questionnaires were returned (of 991 sent out), giving a return rate of 30.9%. 54 postnatal partner questionnaires were received.



*The protocol was altered midway through the study due to high levels of GP non-response to be an opt in condition

Figure 4: Consort diagram for maternal ante and postnatal screening questionnaires

5.4.3 Procedure for recruitment into follow up study (Study 1)

Mothers scoring over the 95th percentile on the screening questionnaire for OCI items, for RAS items or for combined Z-scores (in each case here labeled 'high risk'), were then invited to participate in the more detailed longitudinal study. A random sample of mothers scoring below the 50th percentile on each of these scales (from here on labeled 'low risk') was also invited to participate. This selection strategy for the low risk participants was designed to avoid the possibility that a sample of those scoring below the fifth percentile may not be representative of the population. Five scoring bands, each covering a consecutive 10 percentile range were established. A low risk participant was selected from each of these bands in turn, with the order of selection randomized over every five participants.

When 'high risk' mothers were identified at the point of screening, the next consecutive 'low risk' mother from the same recruitment setting whose questionnaire score was from the appropriate percentile band was invited to participate. Mothers were contacted using the contact details they had given and attempts to contact mothers ended once the seven month antenatal assessment point had passed.

A proportion of the questionnaires were excluded from consideration as they had been used to establish screening cutoffs (n=200), mothers had requested no contact about the detailed follow up study in particular n=103 or had not provided any contact details n=237.

From the 1135 remaining questionnaires that were completed over the course of the study, 83 mothers were identified as potential high risk participants based on scores above screening questionnaire thresholds in any of the three categories and attempts were made to contact them as well as a consecutively identified control participant. If a control mother was uncontactable or declined, this mother was replaced with the next suitable control in the next 'batch' of names provided to the blind assessors. Mothers were not always consistent in how long it took to reply. Therefore, more control than high risk mothers were invited to take part leading to unequal groups. High and low risk mothers were recruited into the study contemporaneously.

Despite giving consent for further contact, 157 mothers were uncontactable prior to and during the window of the seven month assessment. A further 7 mothers had lost their babies, 3 were moving out of the country. This left 49 mothers who consented to take part (33 low risk and 16 high risk).

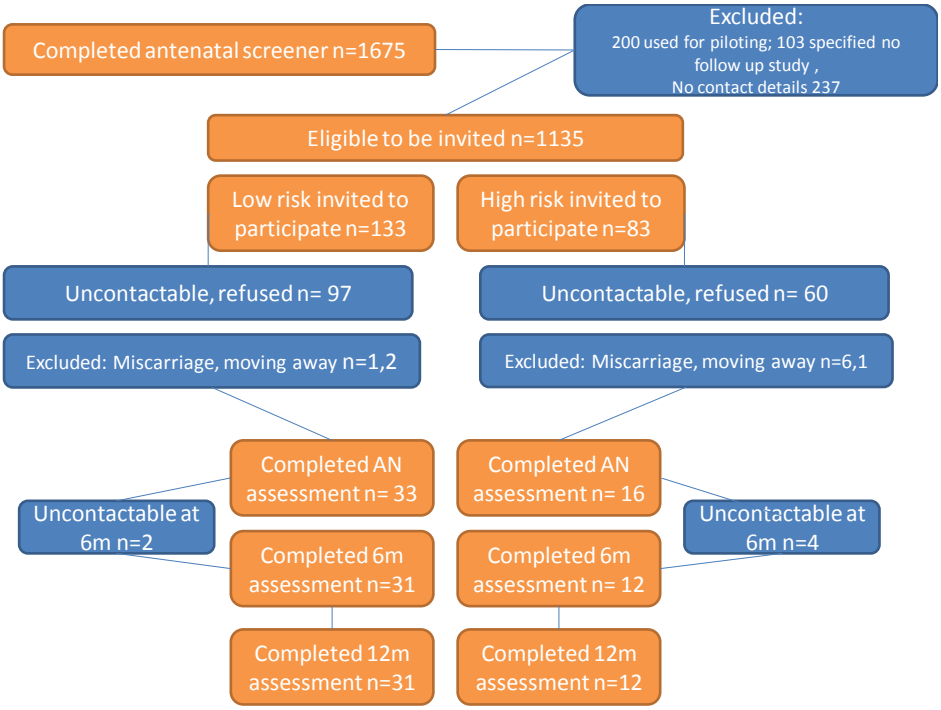


Figure 5: Consort diagram for the longitudinal follow-up (Study 1)

Community studies in perinatal mental health that have recruited antenatally and requiring face to face contact showed participation rates of 41-95% (Andersson, Sundström-Poromaa et al. 2003; Sutter-Dallay, Giaconne-Marcesche et al. 2004; Adewuya, Ola et al. 2006; Kitamura, Yoshida et al. 2006) . In longitudinal studies, retention rates of 47-77% over the first postnatal year have been reported (Abramowitz, Nelson et al. 2007; Chaudron and Nirodi 2010; Mauri, Oppo et al. 2010)**.** The current study used a two stage procedure to recruit mothers into the detailed follow up study. As mentioned 68.4% of mothers completed an initial screening questionnaire; however, only 22.7% of those with whom contact was attempted were successfully recruited into the follow up study.

Assessment took place at three time points: seven months antenatal, then six and twelve months postnatal. The assessor was blind to screening questionnaire scores

and group status. It was aimed that assessments would take place within (+/-) two weeks of the stated time point.

Assessments took place in the participants' homes and involved a background interview, clinical interview and videotaped observations of mother-infant interactions, described in detail below. Questionnaires were sent in advance for the mother to complete. Mothers were given £30 for each completed assessment as a token of thanks for their time. A further similar assessment took place when the baby was twelve months old. At this timepoint, mothers were also invited to come to the research centre to complete the strange situation procedure. All mothers were invited to take part in the videotaped interactions although this data was collected for the purpose of comparison between OCD and community control mothers.

5.4.4 Procedure for randomised trial (Study 2)

The clinical sample of mothers with OCD was drawn from samples of convenience, recruited from multiple sources. The research was advertised as a study into CBT for women with postnatal OCD and all women were guaranteed treatment if they participated at one of two timepoints. The study was publicised to local clinical services that might refer participants and advertisements on service user-led OCD websites so that potential participants could refer themselves. An advert was also placed on the parenting website MumsNet. The sample was predominantly self-referred.

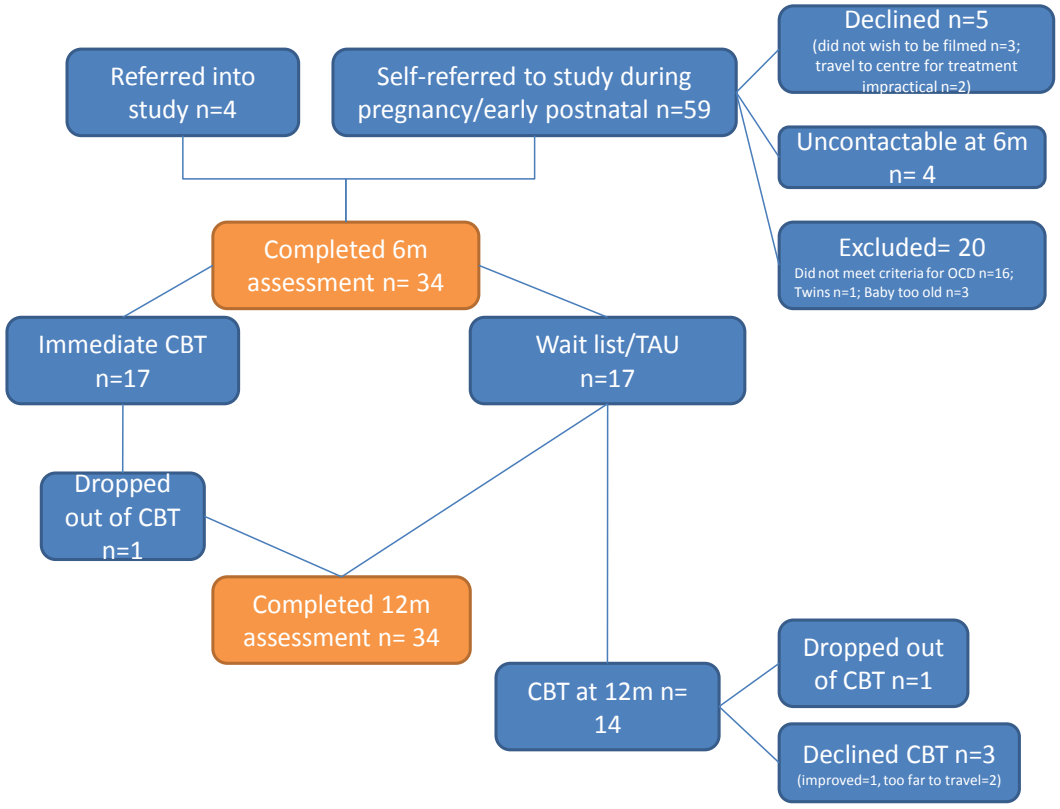


Figure 6: Consort diagram for the pilot randomized trial (Study 2)

At the initial contact with the participant, an overview of the study rationale and procedure was explained. If this was satisfactory to the participant, the diagnosis of OCD was then confirmed using the SCID and other exclusion criteria (i.e. baby older than six months; developmental difficulties identified in child; twins) were disconfirmed. The participant was then sent the full consent form by post or email to examine for a minimum of two days. At a follow up contact the participant had the opportunity to ask any questions. When informed consent had been obtained the researcher arranged to visit the participant at around the time their baby was six months old (+/- two weeks). If there was a lag between the initial contact point and the six month assessment, diagnosis was reconfirmed prior to arranging the visit.

The assessments took place in the participant's home and involved a background interview, clinical interview and videotaped observations of mother-infant interactions, described in detail below. Questionnaires were sent in advance for the mother to complete. Mothers were given £30 for each completed assessment as a token of thanks for their time. A further similar assessment took place when the baby was twelve months old. This assessment was conducted by a researcher blind to group allocation. At the twelve month timepoint, after the home based assessment had taken place, mothers were also invited to come to the research centre to complete the Strange Situation Procedure.

The six month assessment point was chosen for both cohorts in order to identify women with clinically significant rather than potentially transient symptoms of OCD which surveys suggest may be common in the immediate postnatal months [Miller et al 2013]. In addition six to twelve months is the time at which the attachment relationship is thought to be consolidated. The twelve month assessment point was chosen as it is the optimal time to conduct the strange situation procedure to measure attachment and allowed time for any benefits of treatment to take effect.

5.4.5 Randomisation procedure

Once the six-month assessment had been completed a randomisation envelope was opened which established which treatment group the participant would be in. The participant was informed immediately as to the outcome of the randomisation.

Randomisation was generated using a freely available computer web-based programme (www.randomization.com). A random sequence of the two categories

was generated in blocks of 6. A person unconnected with the study placed cards with each category in numbered individual envelopes, which were then sealed. The researchers and participant were blind to group allocation until the envelope was opened at the end of the baseline assessment. The follow-up assessment was conducted by a researcher who was blind to group allocation and was not in any way involved in treatment.

5.5 Assessment measures study 1 and 2

5.5.1 Maternal mental state

Structured clinical interview for DSM-IV (SCID-IV,(First, Spitzer et al. 1995). This semi-structured interview is used to establish DSM-IV diagnoses (APA, 1994). The SCID has been shown to have acceptable reliability (Segal, Hersen et al. 1994). Most major categories have kappas of 0.6 or above (Williams, Gibbon et al. 1992).

In study 1 with community participants the full SCID screener and interview (research version) was conducted face to face as part of the antenatal assessment. Modules from the SCID were used to assess postnatal diagnoses. In study 2 for mothers with OCD the full screener and interview was conducted via telephone with all clinical participants in order to diagnose OCD and to screen for other psychiatric problems prior to participants entering the study.

Yale-Brown Obsessive-Compulsive Inventory (YBOCS)

The Yale-Brown Obsessive Compulsive Inventory (Goodman, Price et al. 1989) is a 14 item clinician administered interview to establish the severity of obsessional and compulsive symptoms. Convergent validity of the measure with other clinician rated measures such as the CGI are reasonable r=0.74. Lower convergence with self-report measures such as the Maudsley Obsessive-compulsive inventory (MOCI) was reported as r=0.53 (Goodman, Price et al. 1989). Interrater reliability correlations have been reported as r=0.86-0.97 for individual items and r=0.98 for total scores (Goodman, Price et al. 1989; Woody, Steketee et al. 1995).

Score	<7	8-15	16-23	24-32	33-40
Categorisation	Subclinical	Mild	Moderate	Severe	Extremely severe

Table 14: YBOCS total score category cutoffs

The instrument is sensitive to treatment effects and the YBOCS is a widely used measure of change in clinical trials. Some factor analyses have confirmed the factor structure of obsessions and compulsions. However, based on exploratory factor analysis, the YBOCS has been found to have a two factor structure: on severity and interference from obsessive-compulsive symptoms and resistance/control of these symptoms (Deacon and Abramowitz 2005). A 30% reduction in pretreatment scores on the YBOCS has been considered clinically significant (Tolin, Abramowitz et al. 2005).

In study 1 the YBOCS was administered where indicated by responses on the OCI or the PDSQ. In study 2 it was administered to all participants at six months prior to randomization and at twelve months postnatally by a researcher blind to group

membership. The post treatment YBOCS at 7 months was conducted by the treating clinician.

Raters had been trained as part of work in a specialist clinical setting for the assessment and treatment of OCD with some raters at psychology graduate level trained by the author as part of the research study.

Obsessive Compulsive Inventory-Revised (OCI; Foa, Kozak et al. 1998). This is a 42–item self-report inventory concerning symptoms of OCD. Respondents take the preceding month into account and rate each item on a 0-4 Likert scale for how frequently it occurred (0 = Never to 4 = Almost always) and the distress caused (0 = Not at all to 4 = Extremely). It is composed of seven subscales relevant to different manifestations of obsessional behaviour (washing, checking, doubting, ordering, obsessing (i.e. having obsessional thoughts), hoarding and mental neutralising. The internal consistency for the full scale is high (0.86-0.95), whilst it is satisfactory for the subscales (>0.7, apart from neutralising). The OCI has good test-retest reliability for total scores, and satisfactory reliability for subscale scores. The OCI also shows good discriminative validity and is reliable to measure change in symptoms over time (Abramowitz, Tolin et al. 2005). The distress scale only was used for this study.

Responsibility Attitudes Scale (RAS; Salkovskis, Wroe, Gledhill, Morrison, Forrester, Richards, Reynolds & Thorpe S, 2000). This 26-item questionnaire was designed to assess general beliefs about responsibility. Respondents are asked to rate the degree to which a series of statements generally applies to them. Ratings are on a

seven-point scale from totally disagree to totally agree. The scale has high test-retest reliability and internal consistency (r = 0.94; α = 0.92; Salkovskis et al, 2000).

Depression, Anxiety and Stress Scale (DASS; Lovibond and Lovibond 1995). The DASS is a 42-item self-report questionnaire designed to measure states of depression, anxiety and tension/stress. Items refer to three types of symptoms and the frequency/severity with which they occurred over the last week. Depression items tap symptoms related to dysphoric mood, anxiety items tap symptoms related to physiological arousal whilst the stress scale taps symptoms related to irritability and overreaction to stressful events. Respondents rate items on a 0 ('did not apply to me at all') to 3 ('applied to me very much/most of the time). Scores are calculated for each subscale by summing the relevant items. In a normative sample internal consistency for each scale was Depression 0.91; Anxiety 0.84, Stress 0.9, and the three factors have been found to be distinct (Lovibond and Lovibond 1995). Similar properties have been demonstrated in clinical samples (Brown, Chorpita et al. 1997; Antony, Bieling et al. 1998).

	Depression	**Anxiety**	**Stress**
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

Table 15: DASS score category cutoffs

Perceptions of Adult Attachment Questionnaire (PAAQ; Lichtenstein & Cassidy, 1991). The PAAQ is a 60-item self-report questionnaire assessing two key aspects of attachment: (a) perceptions of early childhood experiences with a primary caregiver, and (b) one's 'current state of mind with respect to attachment'. These two super-ordinate dimensions are organized into eight subscales and items are based on Main and Goldwyn's (1984) method for scoring the Adult Attachment Interview (AAI: George, Kaplan, & Main, 1984) and on Bowlby's attachment theory (1969/1982).

Items are rated using a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. The three subscales tapping perceptions of the childhood relationship with the primary caregiver include (a) rejection/neglect (11 items; e.g., "When I was a child, my mother sometimes told me that if I was not good she would stop loving me"), (b) being loved (6 items; e.g., "In childhood I felt like I was

really treasured by my mother"), and (c) role-reversal/enmeshment (10 items; e.g., "I often felt responsible for my mother's welfare"). The five subscales tapping current state of mind with respect to attachment include (a) vulnerable (5 items; e.g., "My mother's issues are still interfering with my life"), (b) balancing-forgiving (7 items; e.g., "Even with all our past difficulties, I realize my mother did the best for me that she could"), (c) angry (5 items; e.g., "No one gets under my skin like my mother"), (d) dismissing/derogating (4 items; e.g., "My family was not particularly intimate, but this has never bothered me"), and (e) lacking in memory about childhood (4 items; e.g., "I have forgotten what most of my early childhood was like"). Subscale scores are derived by calculating the mean of the items comprising each subscale (with a possible subscale range of one to five).

Good psychometric properties for the PAAQ have been reported. In a validation study of 247 college students by (Lichtenstein & Cassidy,1991), factor analysis revealed support for the theoretically based subscales, and the subscales showed high internal consistency (coefficient alphas: rejection/neglect=.87, being loved=.87, role-reversal/ enmeshment=.79, vulnerable=.71, balancing/forgiving=.70, angry=.80, dismissing/derogating=.62, lacking in memory=.90). In a second sample of 123 mothers, coefficient alphas were rejection/neglect = .91, being loved = .92, role-reversal/enmeshment=.69, vulnerable=.76, balancing/forgiving=.65, angry=.84, dismissing/derogating= .51, lacking in memory=.94) (Lichtenstein & Cassidy, 1991).

Good test-retest reliability also emerged in Lichtenstein and Cassidy's (1991) college student sample, ranging from .68 to .86 over a 3-week retest interval.

Good construct validity for the PAAQ has emerged. Lichtenstein and Cassidy (1991) reported significant correlations between the PAAQ and AAI subscales in their sample of 123 mothers (rs=.46 – .63, p=.01), except for the enmeshment/role-reversal subscale (r=.10) and the dismissing/derogating subscale (r=.13). (Huth-Bocks, Levendosky et al. (2004) found that higher scores on a composite index of insecure attachment based on six of the eight subscales was related to pregnant women's lower satisfaction with social support and less secure representations of caregiving (assessed with the Working Model of the Child Interview; (Zeanah and Regan 1994).

Social Support Questionnaire (PSSS; Marshall and Barnett 1993). This is an 11-item self-report measure based on Weiss's (1974) conceptualization of the function of social relationships with regard to the sharing of concerns, intimacy, opportunity for nurturance, reassurance of worth and assistance or guidance. Items are scored from 1 ('none of the time') to 6 ('all of the time') according to the respondent's experiences over the past month, and a total score is then calculated. Cronbach's alpha was reported as .91. Test-retest correlation over 4 months was 0.68. It was found to correlate with depression (r = -0.38, p < .001), anxiety (r = -.23, p < .001) and physical health as measured by physical symptoms (r = -.20, p < .001).

Golumbok-Rust Inventory of Marital Satisfaction (GRIMS; (Rust, Bennun et al. 1986). The GRIMS is a 28 item self-report questionnaire assessing the quality of a respondent's intimate relationship (i.e. a marriage or similar partnership). Items are scored on a four-point Likert scale ranging from 'strongly agree' (0) to 'strongly disagree' (3). Items are summed to obtain a total score, from which a satisfaction

banding is then derived. Alphas of 0.86 in community and 0.89 in clinical groups have been reported and mean differences have distinguished between groups seeking treatment for relationship and sexual difficulties (Rust, Bennun et al. 1990).

Relationship Questionnaire (attachment) (Bartholomew and Horowitz 1991)

The Relationship Questionnaire was developed by Bartholomew and Horowitz (1991) based on their four-category model of attachment styles in adulthood, as opposed to the original three-category model. The four categories were developed by exploring a person's self-image (positive or negative) and their image of others (positive or negative) to propose the following adult attachment styles: secure (positive model of self, positive model of other), dismissing (positive model of self, negative model of other), preoccupied (negative model of self, positive model of other) and fearful (negative model of self, negative model of other).

Participants are asked to read four short paragraphs describing each of the attachment styles and decide which one is the most characteristic of them. They are then asked to rate on a 7 point likert scale how characteristic each paragraph is.

The paragraphs are as follows:

- It's easy for me to become emotionally close to others. I am comfortable depending on others and having others depend on me. I don't worry about being alone or having others not accept me (secure).
- I am comfortable without close emotional relationships. It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me (avoidant).

- I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don't value me as much as I value them (preoccupied).
- I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others. (fearful).

Bartholomew and Horowitz (1991) found that intercorrelations of the participants' attachment ratings (measured by both self- and friend-report) were consistent with the proposed four-category model and that these findings could be replicated.

Bartholomew and Horowitz used categorical ratings in analysis of correlated concepts and found a theoretically consistent pattern of warmth, self-confidence and friend-rated intimacy and control in relationships. Categorical ratings were used by Irons et al (2006) in a study exploring relationships between attachment style, parenting and depression (Irons, Gilbert et al. 2006). In the current study participants were asked to make a categorical rating.

Maternal Self-Efficacy Scale (Pederson, Bryan et al. 1989). Maternal efficacy was assessed using the self-efficacy in the nurturing role scale, which was adapted by Pedersen, Bryan, Huffman, and Del Carmen (1989) from the parenting sense of competence scale developed by (Gibaud-Wallston and Wandersman 1978). This scale contains 16 items rated on 7-point scales that pertain to mothers' perceptions of their competence on basic skills required in caring for an infant (e.g., "I feel

confident in my role as a parent," "I can soothe my baby easily when he or she is crying or fussing," "Touching, holding, and being affectionate with my baby is comfortable and pleasurable for me").

Scores on the SENR were obtained by summing individual items to yield a total efficacy score, with higher scores reflecting greater feelings of efficacy. In the past, this scale has shown robust test–retest reliability and moderate to high internal consistency (Pedersen et al., 1989). Reported in (Porter and Hsu 2003).

(Porter and Hsu 2003) reported an internal reliability (Cronbach's alpha) of the scale of 0.91 during the antenatal assessment and 0.78 at both 1 and 3 months postnatal. In this study, one month efficacy scores were found to correlate with maternal anxiety ($r=-0.42$, $p<0.001$) but not depression.

5.5.2 Infant measures

Bates Infant Temperament Questionnaire (ITQ; Bates, Freeland et al. 1979)).

Infant temperament at six and twelve months was assessed using two age appropriate versions of the Bates Infant Temperament Questionnaire. This parent-report measure consists of 24 items, each requiring the mother to rate her baby on a 1-7 scale of how her baby fits with the characteristic described. Four factors emerge from the questionnaire: 'infant difficultness', 'unadaptability' (how much the infant dislikes new experience, somewhat akin to behavioral inhibition), 'dullness' (how much or little the infant responds positively to stimuli) and 'unpredictable' (how much the infant is able to get into a routine).

Internal consistency for subscales ranges from alphas of 0.39 for the dull subscale to 0.79 for infant difficultness. Test-retest reliability for subscales ranges from 0.47 unpredictable subscale to 0.70 for infant difficultness. Moderate correlations have been reported between independent observation of fussiness (0.22) and soothability (0.18) and ICQ infant difficultness (Bates, Freeland et al. 1979).

5.6 Mother-infant relationship measures

5.6.1 Observed mother-infant interactions

Mothers and infants were observed and videotaped in three 'everyday' interactions. These were (i) a solid feed, (ii) a nappy change and (iii) play (firstly without any toys and then with toys provided by the researcher). Mothers were instructed that the idea was to capture typical interactions and that therefore the researcher would set up the video and withdraw if possible (for example in situations where the baby was not mobile such as feeding in a highchair) and would not attempt to interact with the mother or child during the recording. After the feed and nappy change mothers were asked if that interaction was typical of that particular situation. If it was significantly untypical (determined by the researcher on the basis of the mother's reasons), the researcher arranged to return to repeat the filming of that particular situation. This occurred on three occasions.

Nappy changing and feeding were filmed in as typical a situation as possible at six and twelve months. For play at six months the mother was asked to play with the infant for three minutes without toys, following which a bag of various toys was

handed to the mother with the sole instruction "*these are for you to play with in any way that you like*". Five minutes of play with toys was filmed. The toys were:

a toy frog; a textured baby book; a set of 10 coloured plastic stacking cups; a toy aeroplane; a fish teething toy; a toy seahorse; a toy bee with a vibrating function; soft stacking blocks; a manipulative toy with clicking and shaking functions.

The choice was deliberately wide with too many toys to play with exhaustively and individually in the five minutes available; the instructions were given so that the onus was on the mother to choose which and how many of the toys to present to the infant. The toys were appropriate for children aged 3-9 months.

At twelve months the mother was asked to play with the infant without toys for three minutes then a sequence of individual toys was handed to the mother with the sole instruction "*this is for you to play with in any way that you like*". The dyad played with the toy for three minutes. As each subsequent toy was presented, the previous toy was removed. The sequence of toys was:

(i) shape sorter (ii) stacking rings (iii) soft horse puppet (iv) hammerballs

The toys were appropriate for children of 12 months and were chosen to engage the child in various motor and cognitive skills as well as eliciting varying levels of participation and guidance from the mother.

5.6.1.1 Observational coding system

The coding system comprised established coding dimensions with the addition of some novel dimensions to capture behaviours relevant to OCD. A series of tapes were reviewed by the candidate in order to establish the coding variables and anchor points. Specific examples were noted to establish anchor points within this sample and for training purposes.

Ratings of maternal **sensitivity** and **cooperatives/intrusiveness** on a 1-9 scale used Ainsworth's definitions and descriptions (see Appendix 4 for full coding manual containing detailed item descriptions).

Maternal **warmth** during interactions was rated using a 1-9 scale. Warmth has been rated using similar scales in (Nicol-Harper, Harvey et al. 2007).

In order to capture potentially observable interference directly related to obsessions and compulsions, a novel code of '**overconscientiousness'** was devised. This was developed after scrutinising videos of the pilot cases to scan for evidence of reported interference by some mothers with OCD of their own symptoms with everyday parenting tasks. For example some mothers reported that nappy changing was sometimes difficult when they experienced intrusive thoughts and they would need to stop and take extra precautions such as additional wipes or performing a ritual. This coding category was therefore included to examine how observable and widespread this type of behaviour was and if it distinguished mothers with OCD from the non clinical group in observed interactions.

Global ratings across the entire interaction were made for **infant behaviour** (1 = not lively; 2 = average; 3=exceptionally lively) and **dyadic interaction** using a 1-5 scale.

Infant directed **maternal vocalisations** were scored using time sampling in 15 second segments. Each segment would be rated positively if the mother directed any vocalisation to the infant in that time. Ratings were then summed and divided by the total number of codeable segments to provide a percentage.

Finally maternal emotion and infant emotion were coded. Mothers were rated for each 15 second segment on whether they displayed any of neutral/positive, flat, anxious/stressed emotions. Infants were rated using 15 second samples of time for neutral/positive affect, flat affect and fussy/distressed. The codes were not mutually exclusive.

Initial attempts to separate neutral and positive ratings in mothers and infants did not yield adequate reliability and these ratings were therefore collapsed.

5.6.1.2 Inter-rater reliability of the observational coding system

A series of four tapes were reviewed by the candidate in order to develop coding variables and identify cases which exemplified the anchor points for each scale. These tapes were then used as the basis to train an independent rater, blind to group membership.

Inter-rater reliability was established by comparing ratings of 10 tapes of mothers with six month olds and 5 tapes of mothers with twelve month olds. Reliability was calculated for each scale and for each task at both timepoints.

Over-conscientiousness was a relatively low frequency event. Therefore, this was dichotomised into occurred versus did not occur and % agreement calculated. There was very low variation in the three point infant liveliness rating scale. % agreement was also calculated for this scale.

	Sensitivity	Cooperation-Interference	Warmth	Overconcientiousness	Infant behaviour	Dyadic rating	Maternal vocalisations	Maternal mood	Infant Mood
	1-9 scale	1-9 scale	1-9 scale	0-3 scale	1-3 scale	1-5 scale	% of interaction	3 categories	
6m	0.931	0.707	0.805	90% agreement	76.6 % agreement	0.881	0.955 % agreement	0.936	0.969
12m	0.849	0.755	0.890	86.6% agreement	66.6 % agreement	0.805	0.939 % agreement	0.954	0.846

Table 16: Intraclass correlation coefficients and percentage agreements for all 6m and 12m video ratings

	Sensitivity	Cooperation-interference	Warmth	Overconcientiousness	Infant behaviour	Dyadic rating	Maternal vocalisations	Mat mood	Infant Mood
	1-9 scale	1-9 scale	1-9 scale	0-3 scale	1-3 scale	1-5 scale	% of interaction	categories	categories
Play	0.918	0.7892	0.749	90% agreement	76.6% agreement	0.886	0.988	0.989	0.949
Feed	0.932	0.548	0.815			0.887	0.978	0.996	0.952
Nappy	0.9312	0.774	0.755			0.881	0.911	0.829	0.965

Table 17: Six month reliability ratings by task (ICC unless otherwise stated)

	Sensitivity	Cooperation-interference	Warmth	Overconcientiousness	Infant behaviour	Dyadic rating	Maternal vocalisations	Maternal mood	Infant Mood
	1-9 scale	1-9 scale	1-9 scale	0-3 scale	1-3 scale	1-5 scale	% of interaction	categories	categories
Play	0.897	0.805	0.924	86.6 % agreement	66.6% agreement	0.825	0.931	0.998	0.829
Feed	0.695	0.825	0.713			0.881	0.922	0.902	0.751
Nappy	0.895	0.593	0.923			0.642	0.93	0.964	0.902

Table 18: Twelve month reliability ratings by task (ICC unless otherwise stated)

Most ratings had 'excellent' reliability (ICC>0.75) with the exception of cooperation/interference at 6 months (ICC= 0.7) which was 'acceptable'.

Having established satisfactory reliability the primary rater, who was blind to all group memberships (i.e. OCD v non OCD and treatment group), coded 100% (60/60) of the remaining 6 month tapes and 73% (48/65) of the 12 month tapes.

Unblinding between non-clinical and OCD groups occurred in three cases for the primary rater: one as the mother mentioned her OCD during the video; one whom the rater had come across as a clinical participant in another study; one whom the rater had been unblinded to in the course of data collection which she had assisted with prior to coding. Therefore blindness regarding OCD status was maintained for 95% of the cases. The primary rater was blind to treatment status for all tapes coded.

5.6.2 Strange Situation Procedure (SSP, Ainsworth)

When the baby was 12m and after completion of the home based assessment, all participants were invited to participate in the Ainsworth Strange Situation Procedure (SSP), which took place in appropriate rooms at Kings College London.

The strange situation procedure consists of eight episodes of interaction which are conducted as a sequence.

1	The observer introduces mother and baby to the room then leaves and begins recording from the adjacent video surveillance room (about half a minute).
2	The mother sits and leaves the baby to explore (2 minutes). If necessary, the mother encourages the infant to engage in play with the supplied toys on the floor (1 minute).
3	The stranger enters the room and is silent (1 minute), converses with the mother (1 minute), then approaches the baby and attempts to initiate play (1 minute).
4	The mother unobtrusively leaves the room as the stranger initiates play with the baby. She remains out of the room for up to 3 minutes (shorter if the baby becomes distressed).
5	The stranger leaves unobtrusively and the mother returns to greet and comfort the baby (3 minutes or more if required). Once the baby is calmed, the mother returns it to the floor and encourages it to play with the toys available.
6	The mother leaves, saying "bye-bye" to the baby. The baby is left alone briefly (3 minutes or less if the baby shows distress).
7	The stranger enters the room and attempts to comfort/engage with the baby (3 minutes or less if baby shows distress).
8	The stranger leaves unobtrusively as the mother enters the room and greets/comforts the baby (3 minutes).

Table 19: Description of episodes of the strange situation procedure (SSP)

A video record was made and subsequently rated according to Ainsworth's coding system. SSP classifications are based primarily on "interactive behaviors" of the infant toward the mother in the two reunion episodes (Ep. 5 & Ep. 8). Behaviours are rated on four 7-point scales: Proximity seeking, Contact maintaining, Avoidance of proximity and contact, and Resistance to contact and comforting. The extent of crying during separation is also recorded. The SSP is watched in its entirety; once interactive subscales have been coded, a categorical rating of either A (avoidant), B (secure) or C (anxious-resistant) is made.

Detailed instructions and anchor points for coding interactive behaviours are provided by Ainsworth in (Ainsworth, Blehar et al. 1978) as well as means for each scale within the three main attachment categories. All infants are assigned an ABC code if possible.

The tape is then recoded for evidence of disorganization (D) which can be scored based on behaviour seen in any episode of the SSP. Disorganised behaviours include disordering of expected temporal sequences (for example a bright greeting followed by avoidance of the parent); simultaneous contradictory behaviour patterns (e.g. approaching the parent with head averted); incomplete or undirected movements and expressions, including stereotypies; direct indices of confusion or apprehension; and behavioural stilling. (Main and Solomon 1986). Such behaviours are noted and then rated on a 9 point scale which evaluates the nature, intensity and timing of the behaviour in order to assign a D category. A D rating is assigned if a summary score of 5 or above has been allotted, based on consideration of all

disorganised behaviours exhibited in the SSP. D functions as a superordinate category and can therefore occur alongside any of the other three categories.

The candidate was trained in the administration and scoring of the SSP by L.Alan Sroufe and Elizabeth Carlson of the University of Minnesota. The author has completed the University of Minnesota reliability assessment tapes. Reliability of over 80% has been achieved in the ABC system and 60-80% in the D system.

5.6.3 Expressed Emotion

Expressed emotion was assessed at 6m and 12m postpartum by use of the five-minute speech sample (Magana, Goldstein et al. 1986).

The following instructions are given to the mother verbatim, with the option for a single specified prompt should the mother stop speaking before the five minutes is up.

"I'd like to hear your thoughts and feelings about [baby]. When I ask you to begin, I'd like you to speak for five minutes telling me what sort of a person he/she is and how the two of you get along together. I won't interrupt you when you are speaking and I will let you know when five minutes is up. Do you have any questions about that before we begin?"

Prompt: *"Can you tell me anything more about [baby] or how the two of you get along together?"*

5.6.3.1 Coding of Expressed Emotion

The coding system was based on and extended that of Magana et al (1986) to include codes for initial statement, overall quality of the relationship, critical comments and emotional over-involvement. Although excluded in some studies of expressed emotion in the parents of young children, the latter category was included to capture potential overinvolvement in this group as this is consistent with the psychopathology of OCD and had been a marginal finding in studies of mothers with OCD who had primary school age children (Challacombe and Salkovskis 2009).

As with Magana's system, the **initial statement** was coded as positive, negative or neutral. The initial statement is coded first, then the rest of the speech sample. The initial statement is thought to reflect the current affective quality of the relationship.

Comments on the **quality of the relationship** were noted and combined to give an overall score.

Examples: "we get on well"; "we have a really strong bond"

If no comment was made about the relationship then neutral relationship status was assigned.

Critical comments were noted and summed. Magana et al (1986) defined criticism as a "statement showing unambiguous dislike, disapproval or resentment of behaviour" scored on basis of content or tone. A lower threshold was taken for critical comments given the very low likelihood of mothers to criticise young children. Comments were considered critical if they indicated deliberate 'naughty'

behaviour or intent on the child or the mother expressed frustration or criticism of the child.

Examples of Criticism:

"He's been a difficult child, very very demanding, spent a lot of time crying" (6m)

"She's also got quite clever as well in manipulation" (12m)

"he goes into a tantrum and sort of does a fake crying thing" (12m)

"he's an unusual child.. hilarious.. except when he's being a little whatnot" (12m)

"She wakes up through the night and drives me mad" (12m)

"she cries a lot for nothing just to get your attention" (12m)

"she is really always hanging on me like my handbag" (12m)

Emotional over-involvement was coded on the presence of either emotional display (e.g. crying, intense anger) or evidence of over-protective or self-sacrificing behaviour or the presence of two of excessive detail, excessive expressions of affection and exaggerated praise. Given that a high degree of involvement is necessary for parenting young children, comments needed to be clearly excessive.

Examples of overprotective/self-sacrificing comments

"I don't like her to cry so I keep her with me until she falls asleep so I can see she's sleeping peacefully.. I check on her a lot at night" (6m)

"I would do absolutely anything for her anything to protect her, erm, and make sure that she's safe and make sure that she's ok"(6m)

"He makes my day most of the time and makes life worth living for"(6m)

"I think I'm going to have separation anxiety because I've always been around and never let her out of my sight really" (12m)

A rating of high expressed emotion was given on the basis of any of: a negative initial statement, the presence of critical comments or emotional over-involvement.

5.6.3.2 Additional codes for the FMSS

Additional codes were also included to capture other aspects of the relationship.

Warmth

A rating of warmth was included on a five point scale which took into account content and tone of the mother's speech.

Mind-minded comments

This coding was designed to capture comments that indicated maternal awareness and observation of the child's internal life and understanding of the child as an autonomous psychological entity. Comments were counted as mind-minded if they included reference to what the child might be thinking.

Examples included

"he fell and he was surprised at what he could do with his legs" (6m)

"she chatters with her toys as though she's having little conversations with them" (12m)

"she will just climb to the top and sit there proudly like she's saying 'look what I've done'" (12m)

"She loves things being explained to her already.. she sits and listens and is interested." (12m).

"I've realised he sort of understands me as well.. when I explain things to him" (12m)

Impact of mother on child comments – these were comments that reflect the impact of the mother's parenting on the child

Examples of positive impact comments included:

"yes I think we are doing a good job with her at the moment.. she's happy and confident" (12m).

"deep down i know i'm doing quite a good job with her and she seems to love me"

"she's a bookworm and i've always encouraged that"

Examples of negative impact comments included:

"there is the time I'm not with her because I'm performing some sort of compulsion and I can hear she's starting to get upset" (6m)

"I do need to give her more freedom in terms of letting other people look after her more so she's not so clingy"

"she's still in the bed with me which is hard because i probably make it worse because i like being close to her"

Impact of child on mother

These were any comments made by the mother that the child or being a parent to the child had an impact on her.

Positive comments included:

"he's taught me a lot of patience" (12m)

"he's a positive influence primarily for just having a different focus in life" (12m)

he's the best thing that's ever happened to me

gives you a new perspective on life really.. it's a refreshing thing

Negative impact comments included:

"where I struggle is if I have to force him to leave..obviously when I force him to do something this is very upsetting" (12m)

"I find it quite overwhelming the level of responsibility of being a parent" (12m)

Expressions of anxiety or worry were also noted.

Examples included "I'm always worrying about being a good parent"

"she's quite clingy with me and i don't know how she's going to cope [with nursery]"

"he makes me panic and worry when he cries" (12m)

"[I worry] is he going to have OCD tendencies?" (12m)

5.6.3.3 Inter-rater reliability of the FMSS

Inter-rater reliability of the FMSS was established by comparing codings on the first 20 speech samples (10 at 6 months and 10 at 12 months). The primary rater who rated 69.9% of the total tapes was blind to group and treatment status.

	6m	**12m**	**Total**
High/Low EE	Kappa = 1	Kappa = 1	Kappa = 1
EOI	Kappa= 0.412	Kappa=1	Kappa=0.459*
Initial statement Categorical rating: positive, negative, neutral)	ICC=0.84	ICC=-0.109	ICC= -0.24
Overall quality of relationship Categorical rating: positive, negative, neutral)	ICC=0.20	ICC=0.052	ICC = -0.77
Presence of critical comments (present/absent)	Kappa=0.375	Kappa=0.375	Kappa= 0.375
Emotional display (present/absent)	Kappa=1	Kappa=1	Kappa=1
Overprotective/self-sacrificing (present/absent)	Kappa=1	Kappa=1	Kappa=1

Past detail/exaggerated praise (present/absent)	Did not occur	Did not occur	Did not occur
Warmth (1-5 rating)	ICC =0.598	ICC= 0.749	ICC= 0.71
Mind minded comments (0-2 rating)	ICC =-0.411	ICC =-0.422	ICC =-0.36
Negative impact on child	r=0.895*	r=0.547	r=0.905*
Negative impact on mother	r=0.509	r=-0.167	r=0.397
Positive impact on child	r=-0.111	r=-0.111	r=-0.76
Positive impact on mother	r=0.625	r=-0.234	r=0.497*
Expressions of anxiety	r=0.540	r=0.136	r=0.564*

*significant at p<0.05 level, **significant at p<0.001 level

Table 20: Inter-rater reliability of the FMSS

Therefore good reliability was found for overall EE ratings, and for the component EE ratings moderate agreement was found for EOI and fair agreement for the presence of critical comments (Landis 1977). Substantial agreement was established for ratings of warmth, comments concerning a negative impact on the child and expressions of anxiety. The remaining ratings did not meet standards of acceptable reliability.

		STUDY 1			STUDY 2		Reference
Concept	**Measure**	**S1 7m AN**	**S1 6m**	**S1 12m**	**S2 6m**	**S2 12m**	
MEASURES ADMINISTERED PRIOR TO ASSESSMENT							
DIAGNOSES	SCID diagnostic interview - screening version & appropriate modules	X	X	X	X	X	(First and Gibbon (2004)
MATERNAL OCD	YBOCS	X	X	X	X	X	Goodman, Price et al. (1989)
	OCI	X	X	X	X	X	Foa, Kozak et al. (1998)
	RAS	X	X	X	X	X	Salkovskis, Wroe et al. (2000)
MATERNAL STRESS, ANXIETY DEPRESSION	DASS	X	X	X	X	X	Lovibond, S.H. & Lovibond, P.F. (1995). Manual for the Depression Anxiety Stress Scales. (2nd. Ed.) Sydney: Psychology Foundation.
MATERNAL ATTACHMENT STATE OF MIND	ASQ (Short paragraphs)			X		X	Bartholomew, K. & Horowitz L.M. (1991). Attachment Styles Among Young Adults: A Test of a Four-Category Model. Journal of Personality and Social Psychology, 61, 226-244.
	PAAQ		X	X	X	X	Lichtenstein, J., & Cassidy, J. (1991, April). The Inventory of Adult Attachment: Validation of a new measure. Paper presented at the Biennial Meeting of the Society for Research in Child Development, Seattle.

		STUDY 1			STUDY 2		Reference
Concept	**Measure**	**S1 7m AN**	**S1 6m**	**S1 12m**	**S2 6m**	**S2 12m**	
MATERNAL SELF-EFFICACY	Self-efficacy scale.		X	X	X	X	Pedersen, F. A., Bryan, Y., Huffman, L., & Del Carmen, R. (1989, April). Constructions of self and offspring in the pregnancy and early infancy periods. Paper presented at the Meetings of the Society for Research in Child Development, Kansas City, Missouri.
SOCIAL SUPPORT	Marshall & Barnett	X	X	X	X	X	Marshall, N.L., & Barnett, R.C. (1993). Work-family strains and gains among two-earner couples. Journal of Community Psychology, 21, 64-78.
DYADIC ADJUSTMENT	GRIMS	X	X	X	X	X	Golombok, S. & Rust, J. (2007). Manual of the Golombok Rust Inventory of Marital State (GRIMS). London: Harcourt Assessment.
INFANT TEMPERAMENT	Bates Infant Temperament Questionnaire		X	X	X	X	Bates, J.E., Freeland, C.B., & Lounsbury, M.L. (1979). Measurement of infant difficultness. Child Development, 50, 794-803.
PARENTING PERCEPTION QUESTIONNAIRE	Challacombe & Salkovskis		X	X	X	X	Challacombe, F. & Salkovskis P.M. (2009). A preliminary investigation of the impact of maternal Obsessive Compulsive Disorder and Panic Disorder on parenting and children. Journal of Anxiety Disorders.
MEASURES ADMINISTERED AT ASSESSMENT/ OBSERVATIONAL MEASURES							
INTERVIEW	Demographics	X	X		X		
	Pregnancy and birth		X		X		

		STUDY 1			STUDY 2		Reference
Concept	**Measure**	**S1 7m AN**	**S1 6m**	**S1 12m**	**S2 6m**	**S2 12m**	
	Infant sleeping & feeding		X	X	X	X	
	Infant health		X	X	X	X	
	Family history		X		X		
EXPRESSED EMOTION (Quality of Relationship)	Five minute speech sample		X	X	X	X	Magana, A., Goldstein, M., Karno, M., Miklowitz, D., Jenkins, J. & Falloon, I. (1986). A brief method for assessing Expressed Emotion in relatives of psychiatric patients. Psychiatry Research, 17, 203–212.
INTERACTIONS	Play no toys		X	X	X	X	Ainsworth, M.; Blehar, M.; Waters, E.; & Wall, S. (1977). Patterns of attachment: observations in the strange situation and at home. Hillsdale, N.J.: Erlbaum,.
	Play with toys		X	X	X	X	
	Feed		X	X	X	X	
	Nappy change		X	X	X	X	
MOTHER-INFANT ATTACHMENT (LAB BASED)	Strange Situation Procedure			X		X	Ainsworth, M.; Blehar, M.; Waters, E.; & Wall, S. (1977). Patterns of attachment: observations in the strange situation and at home. Hillsdale, N.J.: Erlbaum,.

Table 21: Summary of assessment measures in both studies at all timepoints

5.7 Time intensive cognitive-behaviour therapy

Participants received an initial twelve hours of cognitive behaviour therapy, delivered in sessions of 2-3 hours, with the sessions taking place over a two-week period. Up to three follow up sessions of one hour were offered at monthly intervals, with participants taking these up as they preferred.

The CBT took place either in the clinician's office or at the participant's home as determined by pragmatic concerns, primarily the distance between the two. After establishing the participant's goals for therapy, an idiosyncratic formulation was derived in collaboration with the participant based on Salkovskis' model of OCD (Salkovskis 1985). This formulation identified relevant beliefs and behaviours acting as maintaining factors for the problem. Cognitive techniques and behavioural experiments were then used to modify maintaining behaviours and beliefs as indicated by the conceptualisation. All participants tape-recorded sessions and were encouraged to listen to tapes and continue behavioural work between sessions.

Although all participants either travelled or were able to meet at home for the two week intensive treatment which occurred between 6 and 7 months postnatally, takeup and timing of the follow up appointments was more variable. Therefore full data was only available at the six month assessment (pre-treatment), approximately seven months (post-treatment) and at the twelve month assessment (five month follow up).

Therapy was predominantly delivered by the candidate who is a qualified clinician, who received appropriate training and ongoing supervision in cognitive behaviour therapy for OCD for the duration of the study. During the course of the research, three of the thirty-one cases seen for CBT were treated by two other qualified CBT therapists specializing in OCD and familiar with the design and protocol of the study. Two of these were in the CBT group and one was in the TAU group and seen as a crossover case after the twelve month assessment.

6. Results

6.1 Screening sample

6.1.1 Antenatal screening questionnaires

1675 antenatal questionnaires were completed by women of 2123 distributed giving a return rate of 78.9%. Of those returned, 1622 (96.8%) were completed in full; the remainder had at least one missing item and were discarded from the analysis. Partners fully completed 407 screeners (96.9% of 420 questionnaires returned).

OCI item totals ranged from a possible 0 to 40, while RAS item totals ranged from a possible 5 to 35.

Variable	Mothers N=1622	Partners N=407
Age	31.57 (5.56)	34.56 (5.77)
Weeks pregnant	23.59 (7.74)	-
% first time parent	53.87	-
OCI items score mean (s.d)	8.31 (7.40)	5.80 (6.16)
RAS items score mean (s.d)	20.11 (6.80)	19.59 (6.27)

Postnatal OCI items score mean (s.d)	7.17 (6.69)	5.27 (5.79)
Postnatal RAS items score mean (s.d)	18.87 (6.90)	17.93 (6.00)

Table 22: Demographic data for mothers and partners completing the antenatal screening questionnaire

For the screening questionnaire, Cronbach's α for OCI items was 0.88, and for RAS items was 0.86 indicating a high level of internal consistency for this sample.

Taking the predetermined threshold of an OCI score of 23 as indicative of current symptomatology, 107 of the whole sample (6.6%) scored at or above this level (reasonably consistent with analysis of the initial 200).

Maternal scores were categorised according to which trimester of pregnancy they were in, and one-way ANOVAs were used to analyse scores.

	OCI items N=1622 mean (sd)	**RAS items N=407 Mean (sd)**
1st	6.92 (6.30)	19.35 (6.22)
2nd	8.23 (7.47)	20.20 (6.85)
3rd	9.06 (7.71)	20.28 (6.92)

Table 23: Mean OCI item and RAS item scores according to trimester

A significant difference was found on maternal OCI item scores ($F_{[2, 1587]}$=6.3, p=0.002) but not RAS scores ($F_{[2, 1595]}$=1.52, p=0.22).

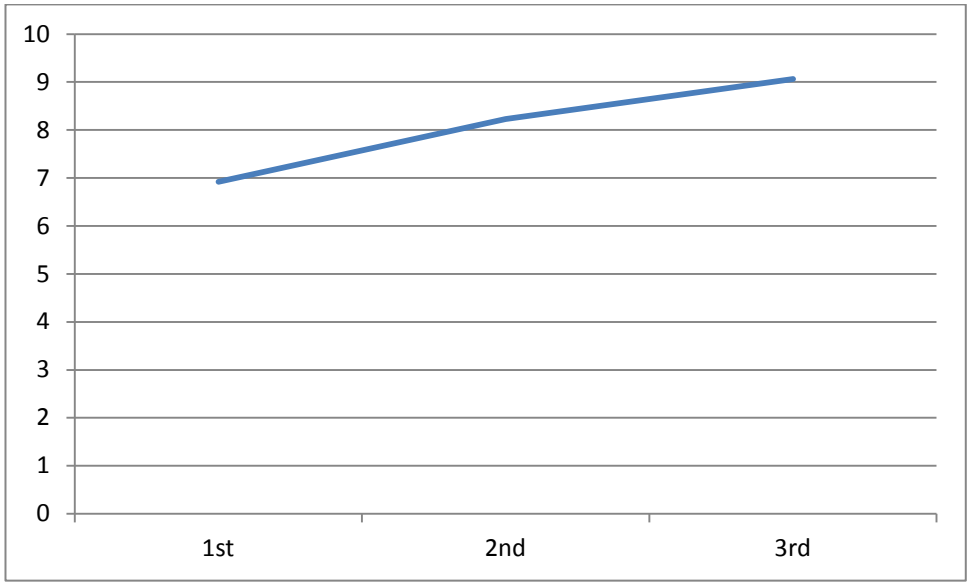


Figure 7: Mean maternal antenatal OCI item scores across trimesters

Posthoc tests on OCI scores indicated a significant difference between the first and both the second and third trimesters of pregnancy (Dunnett T3 $p=0.032$ and $p<0.0001$), but not between the second and third trimesters (Dunnett T3 $p=0.14$), indicating that scores rose most significantly after the first trimester.

Mother's antenatal OCI and RAS scores and partner OCI and RAS scores were all intercorrelated as shown in table 24 below.

	Mother OCI	**Mother RAS**	**Partner OCI**
Mother RAS	0.426***		
Partner OCI	0.424***	0.282***	
Partner RAS	0.263***	0.323***	0.430***

***all significant at p<0.0001

Table 24 : Correlation matrix of mother and partner antenatal screening OCI and RAS scores using Spearman's rho

6.1.2 Postnatal screening questionnaires

307 maternal postnatal questionnaires were returned (of 991 sent out), giving a return rate of 31.0%. 54 postnatal partner questionnaires were received. Mean scores for respondents providing data at both timepoints are given below.

	OCI **Mean (sd)**	**RAS** **Mean (sd)**
Antenatal Q only (n=1322)	8.64 (6.65)	20.27 (6.81)
Mother antenatal total (n=301)	6.82 (6.62)	19.38 (6.69)
Mother postnatal total (n=301)	7.22 (6.74)	18.84 (6.91)
Partner antenatal Q only (n=407)	6.06 (6.67)	19.64 (16.39)
Partner antenatal total (n=54)	4.18 (5.18)	19.41 (5.43)
Partner postnatal total (n=54)	5.42 (5.90)	17.95 (6.04)

Table 25 : Mean antenatal and postnatal scores for subsample

Comparing the antenatal OCI scores of mothers who completed the postnatal questionnaire (301) with those who did not (n=1322), postnatal completers' scores were lower on both antenatal OCI items ($t_{[486.9]}$ =-4.007, p<0.001) and RAS items ($t_{[1627]}$ =-1.97, p=0.049). Fathers who returned postnatal questionnaires also had lower scores on OCI items ($t_{[405]}$ =2.132, p=0.034) but not RAS items ($t_{[405]}$ =0.348, p=0.728).

Using paired t tests to examine the subsample of respondents who returned questionnaires at both timepoints, maternal OCI and RAS scores did not differ from ante- to postnatal ($t_{[301]}$ =-1.05, p=0.29; $t_{[306]}$ =-1.57, p=0.12). Partner mean OCI and RAS scores did differ over time with OCI scores going up ($t_{[55]=-}$2.25, p=0.03) and

RAS scores decreasing ($t_{[57]}$=-2.10, p=0.04). Given differences between questionnaire returners and non-returners these small differences may only apply to this sub-sample.

6.2 Follow-up study

6.2.1 Data analysis plan

It was hypothesised that ***those defined as 'high risk' at screening would display more postnatal psychopathology than 'low risk' participants (hypothesis 1)***. Therefore the two groups were compared on antenatal variables using t tests and chi-square tests as appropriate. To establish whether there were postnatal increases in psychopathology, changes in OCI scores as well as the presence of OCD diagnosis at each timepoint were analysed using repeated measures ANOVAs.

6.2.2 Follow up study baseline demographic and psychopathological variables

The follow up study sample comprised 49 participants recruited antenatally from two general community sonography clinics. From this sample, two groups were characterized on the basis of screening data alone as either 'high risk' or 'low risk' (details in the methodology section above).

The high risk group of 16 women comprised 4 women who scored above threshold on combined scores, 2 above threshold on OCI scores and 10 above threshold on RAS scores. Given the small numbers, the high risk group was analysed as a whole.

The two groups were compared on basic demographic data as shown below. High risk women were younger and less well educated.

Variable	Low Risk N=33	High Risk N=16	
Mean maternal age (sd)	33.85 (4.22)	28.88 (4.92)	$t_{[47]} = 3.66$, p=0.001**
N (%) White ethnicity[1]	27 (81.81)	9 (56.25)	Fisher's exact = 0.086
N (%) Educated to degree level or above	30 (90.91)	9 (56.25)	Fisher's exact = 0.008 *
N (%) single parent	2 (6.00)	2 (12.50)	Fisher's exact = 0.59
N (%) first time parent	18 (54.54)	6 (37.50)	Fisher's exact = 0.36
N (%) male child [§]	14 (45.1)	3 (40)	Fisher's exact = 0.12
Screening OCI score	3.97 (3.47)	19.56 (9.83)	$t_{[16.83]} = -6.16$ **
Screening RAS score	17.45 (5.72)	31.31 (4.66)	$t_{[47]} = -8.41$ **

*p<0.05, ** p<0.01, ***p<0.001. [1] Full details of self defined ethnicity and collapsed categories in appendix **. [§]this data was collected postnatally; the n for each group was 31 and 12

Table 26 Demographic characteristics of follow-up study participants at antenatal assessment

Screening scores on the RAS and OCI for the two groups were distributed as shown below. As participants in the low risk group were selected on the basis of OCI *or* RAS scores below the 50th percentile it was therefore possible to be low on one scale but approaching threshold on the other (those above threshold would have been identified as high risk). Therefore the two groups were distinguishable based on the study cutoffs for these measures, with the majority of the participants in the high

risk group being two standard deviations of this group away from those in the low risk group. The distribution of screening scores in each group is shown below.

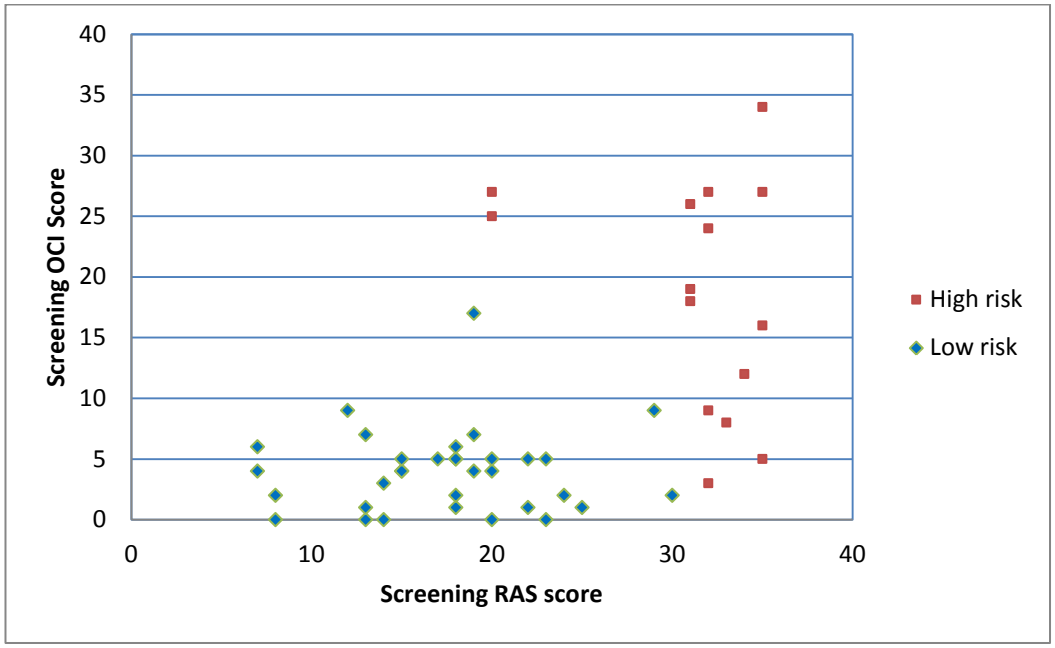


Figure 8: Screening OCI and RAS scores for high and low risk participants

6.2.2.1 Maternal antenatal diagnoses according to the SCID

As described, in this study 'low' and 'high' risk participants were defined and recruited into the follow up study purely on the basis of a short screening questionnaire. When assessed in a face to face interview at approximately seven months antenatally using the SCID, the following current and lifetime diagnoses were established in each group.

Variable		Low Risk N=33	High Risk N=16	Ever v never had diagnosis Fisher's exact test
Depression	Current	1 (3%)	3 (19%)	0.49
	Past only	6 (18%)	2 (13%)	
	Never	26 (79%)	11 (69%)	
Panic disorder	Current	0	1 (6%)	0.03*
	Past only	1 (3%)	3 (18.8%)	
	Never	32 (97%)	12 (75%)	
OCD	Current	0	1 (6%)	0.03*
	Past only	0	2 (12%)	
	Never	33 (100%)	13 (81%)	
PTSD	Current	0	1 (6%)	0.33
	Never	33 (100%)	15 (94%)	
Simple phobia	Current	1 (3%)	4 (25%)	0.01*
	Past only	0	1 (6%)	
	Never	32 (97%)	11 (69%)	
Eating disorder	Past only	4 (12%)	2 (12%)	1.000
	Never	29 (88%)	14 (88%)	
History of alcohol abuse	Past only[1]	0	1 (6%)	0.33
	Never	33 (100%)	15 (94%)	
History of drug abuse	Past only[1]	0	2 (12%)	0.10
	Never	33 (100%)	14 (88%)	

[1]current drug or alcohol abuse was an exclusion criterion; *p<0.05, ** p<0.01, ***p<0.001

Table 27 :Maternal antenatal diagnoses in follow up sample

Table 28 below shows the distribution of diagnoses in the eight 'low risk'

participants (24% of the total) with any current or past diagnosis. All diagnoses were

historical apart from in one participant who had current depression and one who had simple phobia.

Participant 1	Past only	Panic disorder, depression
Participant 2	Current Past only	depression, eating disorder, depression
Participant 3	Past only	Eating disorder
Participant 4	Past only	Depression
Participant 5	Past only	Eating disorder, depression
Participant 6	Past only	Depression
Participant 7	Past only	Eating disorder and depression
Participant 8	Current	Simple phobia

Table 28: Distribution of diagnoses in individual low risk participants

In the 'high risk group', diagnoses were clustered around 8 (50%) of participants, with 7 of these having current diagnoses, as detailed below:

Participant 1	Past only	Simple phobia
Participant 2	Current Past only	Simple phobia, depression Simple phobia
Participant 3	Current Past only	Panic disorder, simple phobia Depression and drug abuse
Participant 4	Current Past only	Simple phobia Panic, OCD, drug abuse
Participant 5	Current	Simple phobia
Participant 6	Current Past only	Depression, Panic, OCD, alcohol abuse
Participant 7	Current Past only	OCD, PTSD Depression
Participant 8	Current	Depression

Table 29: Distribution of diagnoses in individual high risk participants

6.2.2.2 Treatment received in high and low risk groups

Mothers were asked to say what interventions for psychological difficulties they had received at each timepoint.

	Low risk	High risk
0-6 months		
Medication	1	1
Counselling	1	
CBT	1	
6-12 months	1	
CBT	1	1
Counselling	1	

Table 30: Treatment for psychological difficulties received in low and high risk groups

6.2.2.3 Refusal to participate and drop-out according to group

Please see the consort diagram in the method section 5.4.3 for further information as to inclusion and exclusion into the study. Comparison of the groups on participation and dropout indicated that the number of dropouts in the high risk group prior to the six month assessment was a non significant trend, with a quarter compared to only 6% lost to follow-up in the high and low risk samples respectively.

	Low risk	High risk	Fisher's exact
Declined to participate/uncontactable	97/133 (73%)	60/83 (72%)	1.00
Dropped out before 6 month assessment	2/33 (6%)	4/16 (25%)	0.08
Dropped out before 12 month assessment	0/31	0/12	1.00

Table 31: Drop outs at each timepoint in the follow up study (study 1) according to group

6.2.3 Changes in OCD symptomatology over three time-points

6.2.3.1 Self-report obsessional and responsibility scores

OCI and RAS scores for both groups at each time point are presented below.

Variable	Low Risk Antenatal N=33 Postnatal N=31	High Risk Antenatal N=16, Postnatal N=12
Antenatal OCI	10.55 (7.66)	32.10 (36.45)
6m OCI	8.68 (10.55)	20.67 (20.76)
12m OCI	7.84 (8.66)	18.20 (28.11)
Antenatal RAS	85.97 (24.98)	123.90 (22.99)
6m RAS	83.84 (26.37)	108.30 (25.85)
12m RAS	80.52 (26.59)	111.12 (20.87)

Table 32: OCI and RAS means and standard deviations at each assessment point in follow up study (Study 1)

A mixed plot repeated measures ANOVA was used to examine changes in Obsessive compulsive inventory (OCI) scores over the three time-points. Due to dropout and missing questionnaires 41 full datasets were available for these analyses (31 low risk and 10 high risk).

This indicated a main effect of time ($F_{[1.27,49.46]}$ =5.1 Greenhouse Geisser p=0.02), with all groups decreasing in OCI scores over time. There was a significant main effect of group $F_{[1,39]}$ =8.91, p=0.005). There was no significant time by group interaction ($F_{[2,78]}$ =2.38, p=0.10).

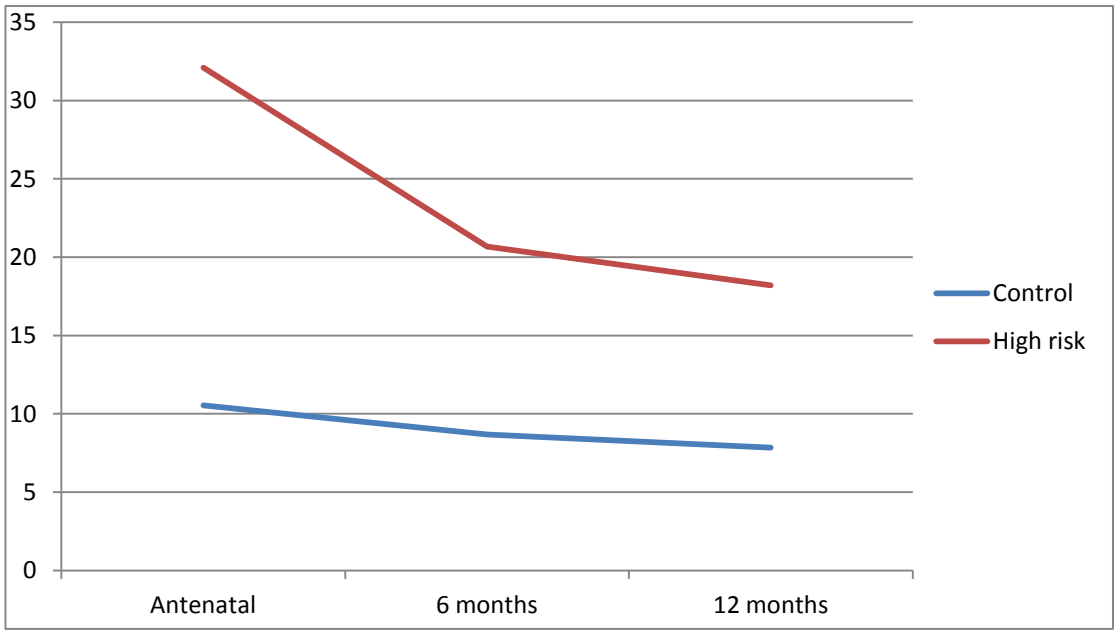


Figure 9: Changes in OCI scores in high and low risk groups at three time points in the follow up study (Study 1)

A repeated measures ANOVA was conducted for the responsibility attitudes scale RAS). In this case, there was no evidence of serial dependency. As with the OCI,

there was a significant main effect of time ($F_{[2,78]}$ =4.73, p=0.01) and group ($F_{[1,39]}$ =8.91, p=0.005) but no interaction ($F_{[2,78]}$ =2.0, p=0.14).

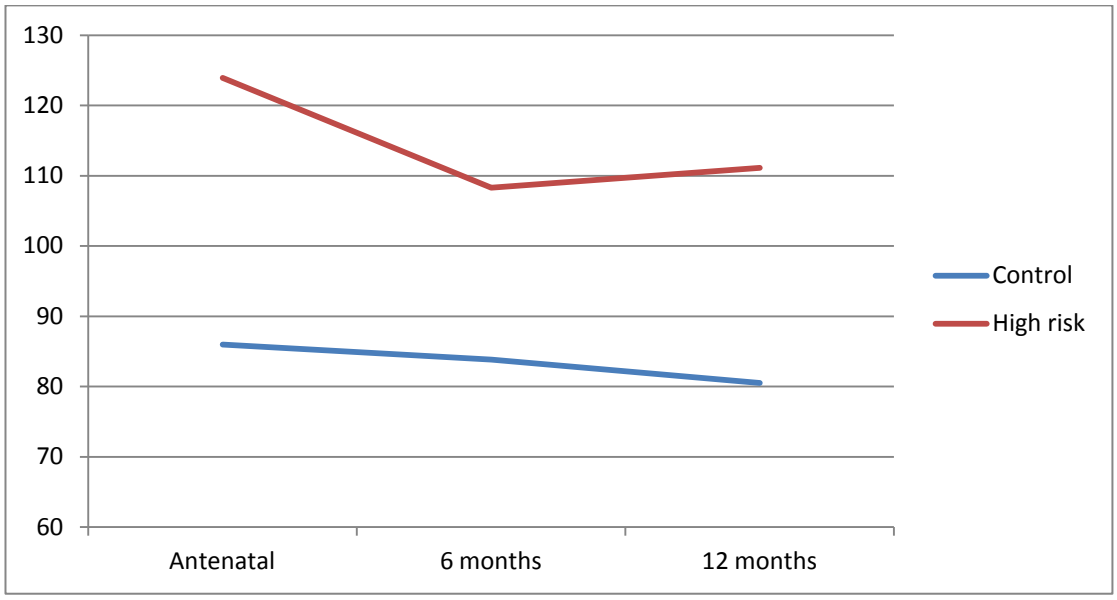


Figure 10: Changes in RAS scores in high and low risk groups at three time pointsin the follow-up study (Study 1)

Given that the groups were recruited with a presumed difference in OCI and RAS scores at the initial time-point, two analyses of covariances were conducted controlling for (i) antenatal OCI and (ii) antenatal RAS scores.

These analyses were not significant (Group main effect: F [1,38] = 0.49, p=0.49; Time main effect F [1,38] = 0.15, p=0.17, group by time interaction F[1,38]=0.06, p=0.81), indicating that no significant change in OCI or RAS scores occurred between the 6m and 12m postnatal assessments.

Finally, OCI subscales were analysed to examine any differential effect for type of obsessional symptoms. The three most theoretically relevant subscales: washing,

checking and obsessions were analysed using repeated measures ANOVA at the three time points.

Overall, there was only a significant main effect of time (Greenhouse Geisser $F_{=[1.231, 53.206]}$ 4.9, p=0.025) and of group ($F_{=[1,39]}$ 8.45, p=0.006). There were no significant interactions.

6.2.3.2 OCD and other current diagnoses at three timepoints

Variable	Low risk	High risk	Fishers exact
OCD diagnosis AN	0/33	1/16	0.33
GAD diagnosis AN	0	0	
Depression diagnosis AN	1	3	
Panic diagnosis AN	0	1	
OCD diagnosis 6m	0/31	3/12	0.02*
GAD diagnosis 6m	1	0	
Panic diagnosis 6m	0	0	
Depression diagnosis 6m	0	1	
OCD diagnosis 12m	0/31	0/12	0.27
GAD diagnosis 12m	1	2	
Depression diagnosis 12m	2	1	

*p<0.05, ** p<0.01, ***p<0.001

Table 33: Ante and postnatal diagnoses in low and high risk groups

The three cases who had a current diagnosis of OCD at any timepoint were examined in more detail, as well as mothers in the low risk group who developed a postnatal diagnosis of anxiety or depression. Unfortunately one questionnaire set had not been returned at 6 months for one of the high risk participants. The available details are shown below.

	High risk			**Low risk**		
	1	**2**	**3**	**4**	**5**	**6**
Historical diagnoses only	MDD ED	OCD Panic Minor DE	None	None	MDE	MDE ED
AN diagnoses	OCD PTSD	None	None	None	None	None
6m diagnoses	OCD	OCD	OCD MDE	GAD	None	None
12m diagnoses	-	GAD	GAD	GAD	MDE	MDE

OCD=obsessive-compulsive disorder; MDD = major depressive disorder; MDE = major depressive episode; ED=eating disorder; Panic = panic disorder; PTSD = post-traumatic stress disorder; GAD =generalized anxiety disorder.

Table 34: Diagnoses of participants in both groups with any postnatal diagnoses

		High risk			Low risk		
		1	**2**	**3**	**4**	**5**	**6**
YBOCS	**AN**	25	-	-	-	-	-
	6m	8 (obsessions only scored)	18	22	-	-	-
	12 m	-	-	-	-	-	-
OCI	**AN**	116	62	75	12	7	16
	6m	19	-	76	8	3	5
	12 m	4	62	94	7	9	18
DASS anxiety	**AN**	29	13	18	8	6	4
	6m	8	-	19	4	3	0
	12 m	7	10	14	4	20	25
DASS stress	**AN**	29	16	23	8	4	7
	6m	12	-	23	15	0	11
	12 m	5	22	20	16	25	28
DASS depression	**AN**	22	18	17	9	2	10
	6m	2	-	22	13	6	2
	12 m	0	13	19	21	9	28
RAS	**AN**	158	107	135	38	104	142
	6m	111	-	122	29	89	76
	12 m	82	134	136	26	96	105

Table 35: Individual questionnaire scores of all mothers who developed postnatal diagnoses in the follow up study

None of the mothers who had OCD at any timepoint had received or was receiving any intervention for this or any other psychological problem. Therefore

symptomatic change did not occur as a result of treatment. None of the mothers who had OCD at any timepoint reported a family history of OCD, anxiety or depression.

Summary

Obsessional symptoms were higher at all three timepoints in the high risk group. However, taken as wholes, symptom and responsibility levels dropped in both high and low risk groups from ante- to postnatal. Clinical levels of OCD developed more frequently in the high risk group, with no cases developing in the low risk group.

6.3 Comparison of clinical OCD and low risk control participants

6.3.1 Data analysis plan

The two groups were to be compared cross-sectionally on a number of variables. The comparison was primarily descriptive; the experiences of women with OCD in terms of parenting using self report and observational data were compared with the control group. Specific hypotheses regarding mother-infant interactions were tested in section 6.4 In order to maximize power, as planned, data from study 1 and 2 were combined to examine group differences as described below.

6.3.2 Group composition

Control participants consisted of the 31 low risk participants from the follow up study that completed both postnatal assessments plus six additional control participants recruited postnatally (total n=37) – see section 5.4.3 in the methodology section for further detail). Comparisons were conducted for data collected on the two groups when their babies were six months old. The OCD group consisted of 34 mothers recruited for the treatment study reported below, who had a current diagnosis of OCD and baby of six months as the inclusion criteria, with the addition of the three mothers who had developed OCD at six months postnatally from the high-risk group in the follow up study (total n=37).

6.3.3 Demographic variables

Variable	Control group N=37	OCD group N=37	
Maternal age	34.65 (4.27)	33.00 (4.88)	$t_{[72]=}1.551$, p=0.125
N, % White Ethnicity[§]	31 (83.8)	31 (83.8)	P=1 Chi square
N, % Educated to A level or above	37 (100)	32 (86.49)	p=0.054 (Fisher's exact)
N, % single parent	1 (2.7)	1 (2.7)	1 (Fisher's exact)
N, % first time parent	19 (51.35)	21 (56.76)	p=0.512 Chi square
N, % male child	16 (43.2)	18 (48.64)	p=0.323 Chi square

*p<0.05, ** p<0.01, ***p<0.001; [§]See appendix *** for full breakdown of ethnicity.

Table 36: Demographic data for OCD and control groups

The two groups were therefore similar on all variables with the possible exception of maternal education, defined as having obtained A-level education or above which showed a non-significant trend. The OCD group tended to have slightly lower levels of education.

6.3.3.1 Current and past diagnoses

Variable		Control N=37	OCD N=37	Fisher's exact: Ever v Never
Depression (major or minor)	Current	0	9 (24%)	0.002
	Past only	8 (22%)	15 (41%)	
	Never	29 (78%)	13 (35%)	
Panic disorder	Current	0	2 (5%)	0.107
	Past only	1 (3%)	4 (11%)	
	Never	36 (97%)	31 (84%)	
Social Phobia	Current	0	2(5%)	0.493
	Never	37 (100%)	35 (95%)	
Agoraphobia	Past only	0	1(3%)	1.00
	Never	37 (100%)	36 (97%)	
Simple phobia	Current	1 (3%)	7 (19%)	0.0005
	Past only	0	1(3%)	
	Never	36 (97%)	29 (78%)	
GAD	Current	1 (3%)	4 (11%)	0.199
	Past only	0	1 (3%)	
	Never	36 (97%)	32 (86%)	
PTSD	Past only	0	1 (3%)	1.00
	Never	37 (100%)	36 (97%)	
Eating disorder	Past only	4 (11%)	1 (3%)	0.430
	Never	33 (89%)	36 (97%)	

Table 37: Current and past diagnoses in OCD and control groups at six months

6.3.3.2 Family history of OCD and anxiety

	Control group N=37	OCD group N=37
OCD		
Mother	0	5
Father	0	2
Sibling	0	2[$]
Partner	0	0
Other anxiety		
Mother	1	5
Father	0	3
Sibling	4	0
Partner	0	2
Depression		
Mother	3	5
Father	6	3
Sibling	3	1
Partner	0	1

[$] one person had OCD in mother and a sibling

Table 38: Family history of anxiety and depression in control and OCD participants

There was more history of OCD in first degree relatives in the OCD group (Fisher's exact=0.005) and of anxiety (Fisher's exact=0.025) but not of depression Fisher's exact=0.800).

6.3.4 Obsessive symptoms and presentation

The makeup of the OCD group in terms of predominant (most interfering) symptom presentation according to the SCID is given below.

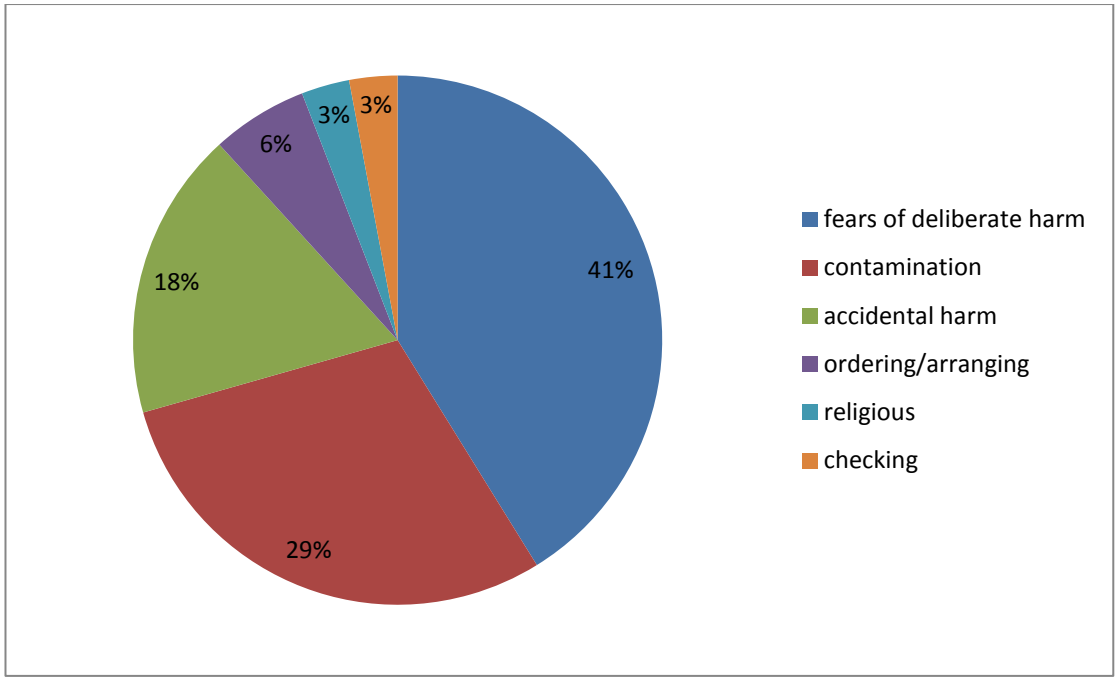


Figure 11: Predominant OCD presentation for clinical cases of OCD

Variable	Control group N=37	OCD group N=37	t, sig at p<0.0001
OCI Total Score	8.14 (9.83)	57.30 (25.88)	$t_{[44.66]}$ §=-10.68***
RAS	81.19 (25.47)	131.81 (24.97)	$t_{[70]}$ =-8.51***

§ denotes unequal variances; *p<0.05, ** p<0.01, ***p<0.001

Table 39: OCD symptom scores in control and OCD groups at six months postnatal

As would be expected, the groups differed significantly on reported distress caused by obsessional symptoms (OCI) and responsibility attitudes (RAS).

6.3.4.1 Comparison of presence and content of obsessions and compulsions at six months

Based on the symptom categories identified by Abramowitz (2007), both groups completed a questionnaire to establish the presence of obsessions and compulsions in each category. This established the proportion of people in each group who had had these experiences; Fisher's exact test was used to compare groups.

	Control group N=37	**OCD group N=36**	**Fisher's exact**
Intrusive thoughts experienced in first six months postpartum			
Baby suffocating	19	14	0.350
Sexual thoughts about baby	1	8	0.013*
Baby may get contaminated	6	17	0.005**
SIDS (cot death)	25	23	0.808
Baby having an accident	28	20	0.087
Intentionally harming the baby	4	18	0.0001***
Losing the baby somewhere	9	13	0.315
Illness	22	22	1
Magical thinking about bad things happening to the baby	3	13	0.004**

Other not listed	0	4	0.051
Compulsions engaged in as a response to the intrusive thoughts			
Self-reassurance	21	33	0.0001***
Seek reassurance from others	21	28	0.081
Checking	26	24	0.804
Seeking social support in general	13	19	0.160
Avoidance	2	27	0.0001***
Cleaning	7	12	0.190
Cognitive distraction (trying to think about something else)	10	27	0.0001***
Religious/prayer	5	10	0.057
Behavioural distraction (trying to do something else)	4	24	0.0001***
Perform a ritual (counting, tapping, straightening)	1	12	0.001***
Other not listed	2	4	0.417

*p<0.05, ** p<0.01, ***p<0.001

Table 40: Presence of obsessional symptoms in OCD and control groups at 6 months postpartum

All categories of obsessions and compulsions were present in both groups, with mothers with OCD experiencing more sexual thoughts, thoughts of contamination, intentional harm and magical thinking regarding the baby. Mothers with OCD were more likely to use self-reassurance, distraction, avoidance and rituals in response to the thoughts.

6.3.5 Maternal depression and anxiety

As would be expected by group allocation, groups differed on all measures of maternal depression and anxiety. The mean scores of mothers with OCD on stress, depression and anxiety lay in the moderate range, with considerable within group variation in scores.

Variable	**Control group N=37**	**OCD group N=37**	t, all sig at p<0.0001
DASS stress scale	6.19 (5.07)	24.17 (10.46)	$t_{[50.25]}^{\S}$ =-9.31***
DASS anxiety scale	1.24 (1.79)	14.08 (9.26)	$t_{[37.53]}^{\S}$ =-8.17***
DASS depression scale	1.78 (2.80)	18.41 (13.66)	$t_{[37.86]}^{\S}$ =-7.16***§

§ denotes unequal variances; *p<0.05, ** p<0.01, ***p<0.001

Table 41: Mean maternal psychopathology scores in OCD and control groups

6.3.6 Parenting and other contextual variables

Mean scores and standard deviations are presented below for parenting self-efficacy, social support, marital satisfaction and mother's 1-4 ratings of enjoyment of key parenting tasks. For all variables apart from the GRIMS, higher scores denote a more positive experience. t tests were conducted to determine whether the groups differed on non-psychopathological variables.

Variable	Control group N=37	OCD group N=36	
Parenting self-efficacy	97.30 (9.00)	81.58 (15.26)	$t_{[56.41]}=5.34^{\S}$, p<0.0001***
Social support scale	58.27 (6.49)	46.72 (12.39)	$t_{[52.54]}=4.97^{\S}$, p<0.001**
Marital Satisfaction scale (GRIMS)[#]	21.91 (10.26)	28.51 (9.80)	$t_{[71]}=-2.81$ p=0.009*
GRIMS relationship banding of 'poor' or worse	3	12	Fisher's exact=0.018*
Enjoyment of nappy change	2.49 (0.69)	1.92 (0.83)	$t_{[72]}=3.20$, p=0.002**
Enjoyment of feed	3.16 (0.73)	2.62 (1.09)	$t_{[62.77]}=2.51^{\S}$, p=0.015*
Enjoyment of play	3.78 (0.48)	3.39 (0.77)	$t_{[58.48]}=2.63^{\S}$, p=0.011*

[§] denotes unequal variances; *p<0.05, ** p<0.01, ***p<0.001; [#] higher score is more dysfunctional

Table 42: Mean scores on self-reported parenting and contextual variables in OCD and control groups at 6 months postpartum

Mothers with OCD felt less efficacious as parents, perceived lower levels of social support and experienced less marital satisfaction. Mothers with OCD rated all parenting tasks as less enjoyable than control mothers.

6.3.6.1 Maternal attachment state of mind

Maternal state of mind with regard to attachment was measured as continuous variables using subscales of the PAAQ. Mean scores and standard deviations are presented below.

	Subscale	Control group N=37	OCD group N=36	
Past attachment experiences	Rejected	1.79 (0.79)	2.01 (0.87)	$t_{[71]}$=-1.12, p=0.27
	Loved	3.86 (0.90)	3.76 (0.99)	$t_{[71]}$=0.46, p=0.64
	Role reversal	2.39 (0.94)	2.73 (0.71)	$t_{[71]}$=-1.73, p=0.09
Current state of mind regarding attachment	Vulnerable	2.52 (0.90)	3.05 (1.06)	$t_{[71]}$=-2.30, p=0.03*
	Balancing-forgiving	3.60 (0.85)	3.56 (0.54)	$t_{[71]}$=0.28, p=0.78
	Angry	2.10 (0.72)	2.30 (0.97)	$t_{[64.63]}$ §=-0.99, p=0.32
	Derogating	2.16 (0.48)	2.38 (0.61)	$t_{[71]}$=-1.77, p=0.08
	Report no memory	2.47 (1.07)	2.66 (0.97)	$t_{[71]}$=-0.81, p=0.42

§ denotes unequal variances; *p<0.05, ** p<0.01, ***p<0.001

Table 43: Self-reported attachment scores (PAAQ) in OCD and control groups at 6 months postpartum

The two groups differed significantly only on the 'vulnerable' subscale, which indicates a sense of the potential to be affected negatively by the attachment relationship in the present.

6.3.6.2 Infant temperament

The means and standard deviations for subscales on the BATES infant temperament questionnaire are shown below.

Variable	Control group N=37	OCD group N=37	
BATES fussy-difficult	16.24 (6.22)	18.64 (5.98)	$t_{[71]}$=-1.68, p=0.10
BATES unadaptable	8.435 (3.44)	9.17 (4.42)	$t_{[71]}$=-0.88, p=0.38
BATES dull	-1.16(2.24)	-1.11 (2.38)	$t_{[71]}$=-0.09, p=0.93
BATES unpredictable	7.70 (3.01)	8.46 (2.94)	$t_{[71]}$=-1.08, p=0.28

*p<0.05, ** p<0.01, ***p<0.001

Table 44: Infant temperament scores in children of OCD and control groups at 6 months postpartum

There were no significant differences between the groups with regard to reports of infant characteristics.

6.3.6.3 Obstetric variables

Variable	Control group N=37	OCD group N=37	Fisher's exact
Planned pregnancy	31	30	1.00
Assisted conception	2	2	1.00
History of miscarriage(s)	8	11	0.68 (chi square)
History of termination(s)	12	3	0.03*(chi square)
Caesarian delivery	9	9	1.00
Breastfeeding at 6m	21	10	0.01*(chi square)

Table 45: Obstetric variables in OCD and control groups at 6 months postpartum

The groups differed in that control mothers were more likely to have a history of termination, and fewer mothers with OCD were breastfeeding at six months postpartum.

6.4 Observed mother-infant interactions and expressed emotion in control and OCD groups at six months

6.4.1 Data analysis plan

It was hypothesised that ***Mothers with symptoms of OCD will exhibit less sensitive interactions (as defined by Ainsworth, see above) at 6 months with their children than those without anxiety (hypothesis 2).*** In order to maximize power, as planned, data from study 1 and 2 were combined to examine this hypothesis.

The two groups of 37 were compared on a number of interactional variables – ANOVAS were used to compare groups at six months, with post hoc tests (LSD or Dunnett) to determine differences between interaction situations and across subscales. The Ainsworth scales of sensitivity and cooperation/interference were first analysed together, followed by the other scales.

6.4.2 Mother-infant interactions

Videotaped interactions were coded using two of Ainsworth's scales and additional ratings of warmth, % of maternal time vocalising to the infant and an overall dyadic synchrony scale.

Means for these scales across tasks are reported below. As mean scores are reported, only participants where data was available for all three tasks were included.

Variable	**Control group N=35**	**OCD group N=36**	
Ainsworth sensitivity (1-9)	6.238 (1.539)	4.861 (1.737)	$t_{[69]}$ =3.53, p=0.001**
Ainsworth cooperation-interference (1-9)	6.200 (1.405)	5.259 (1.463)	$t_{[69]}$ =2.76, p=0.007**
Maternal warmth (1-9)	6.55 (1.19)	5.28 (1.54)	$t_{[69]}$ =3.88, p<0.0001***
Maternal vocalizations (% of total interaction)	95.2 (6.94)	86.1 (14.90)	$t_{[69]}$ =3.29, p=0.002**
Overconscientiousness (0-2 rating)	0.20 (0.38)	0.35 (0.41)	$t_{[69]}$ =-1.61, p=0.112
Dyadic synchrony (1-5)	3.48 (0.85)	2.43 (0.85)	$t_{[69]}$ =3.19, p=0.002**

*p<0.05, ** p<0.01, ***p<0.001

Table 46: Interaction ratings for mothers with OCD and healthy controls at six months postpartum

Note that, according to Ainsworth's categorical ratings, a score of 7 is defined as sensitive, 5 inconsistently sensitive and 3 insensitive.

The inter-correlations between the interaction scales are reported below.

	Sensitivity	Cooperation	Warmth	Vocalisations
Cooperation	.889**			
Warmth	.880**	.785**		
Vocalisations	.568**	.440**	.546**	
Dyadic	.879**	.795**	.840**	.429**

** significant at p<0.001

Table 47: Correlation matrix for mean interaction scales at 6 months across groups

6.4.2.1 Ainsworth Scales

A MANOVA (2x3 mixed model) was conducted to determine if there were differences between the two groups for the two Ainsworth Scales (sensitivity and cooperation-interference) across the three parenting tasks (play, feed, nappy change). A MANOVA was selected because the two Ainsworth scales were assessed in a model that had one between group factor (group) and one within subjects factor (task).

Main effects were detected for group ($F_{[1,69]=}$10.776, p=0.002) and parenting task($F_{[1,69]=}$9.262, p<0.0001) but not scale ($F_{[1,69]}$=3.441, p=0.068).

Significant interactions were found between Ainsworth scale and group ($F_{[1,69]=}$5.052, p=0.028) and Ainsworth scale and task ($F_{[1,69]=}$6.269, p=0.002) but not between group and task ($F_{[1,69]=}$0.816, p=0.445).

No third order interaction was detected ($F_{[2,138]}$ =0.993, p=0.373).

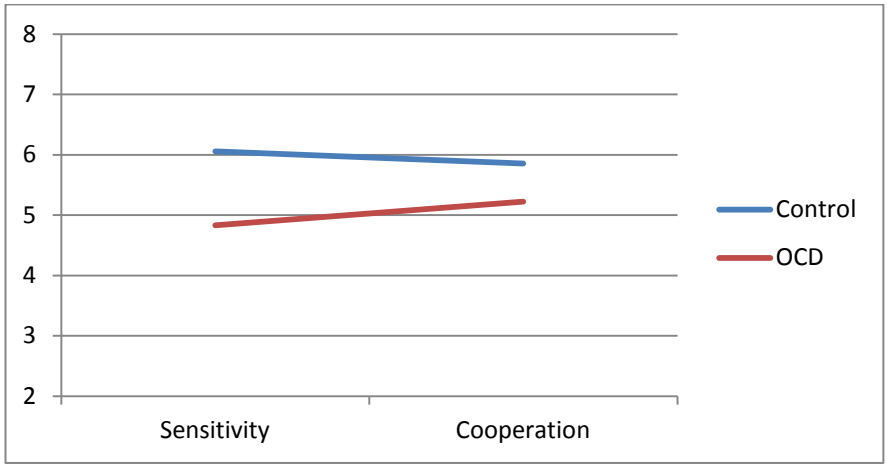


Figure 12: Ainsworth scale scores on the play task at six months

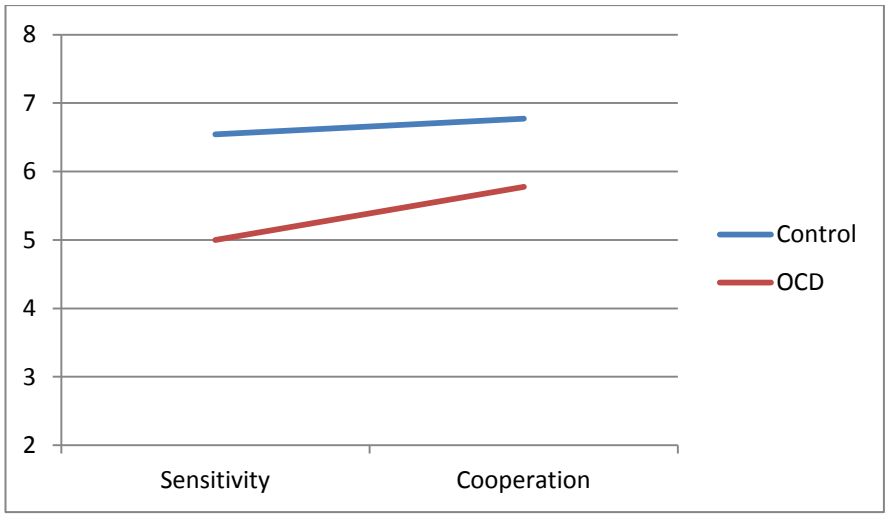


Figure 13: Ainsworth scale scores on the nappy changing task at six months

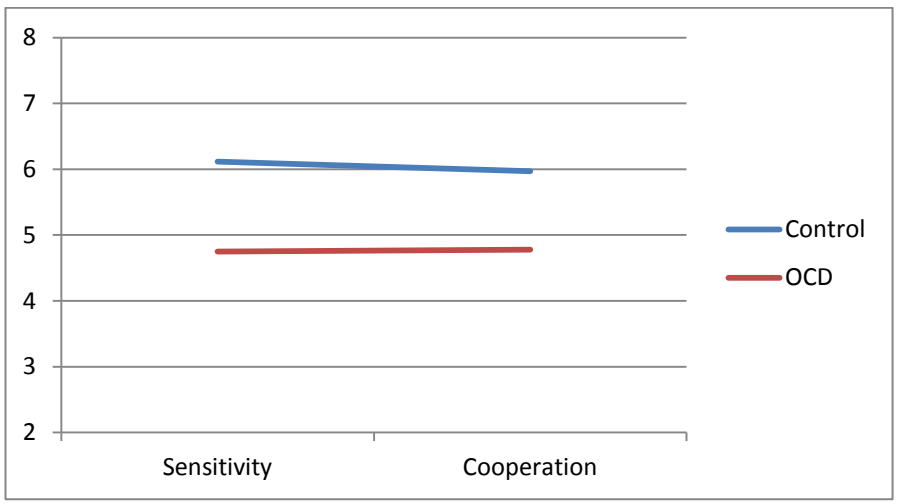


Figure 14: Ainsworth scale scores on the feeding task at six months

This analysis showed that the tasks had differing characteristics, but that mothers with OCD were less sensitive and more intrusive according to Ainsworth scales across all three tasks. Main effects of task and the task by scale interaction were therefore disregarded.

The effect size of the difference in sensitivity between the two groups was 0.839 (Cohen's d).

6.4.2.2 Warmth

Warmth was analysed using a repeated measures ANOVA with task as the repeated factor (three levels) and group as the between groups factor. This was conducted in order to determine group differences in warmth across the three tasks. There was no interaction (p=0.758) but there were main effects for task ($F_{[1.79,123.81]=}$7.17, p=0.002) and group ($F_{[1,69]=}$15.09, p=0.0001) indicating that mothers with OCD differed from controls, and both groups showed different levels of warmth relative to task.

6.4.2.3 Maternal vocalisations

The amount that the mother vocalised to the baby was examined during the three tasks and across groups using a repeated measures ANOVA with task as the repeated factor (three levels) and group as the between groups factor. This indicated an interaction between task and group ($F_{[2,138]=}$4.55, p=0.012) and main effects for task ($F_{[1.79,123.57]=}$13.98, p=0.000) and group ($F_{[1,69]=}$10.84, p=0.002).

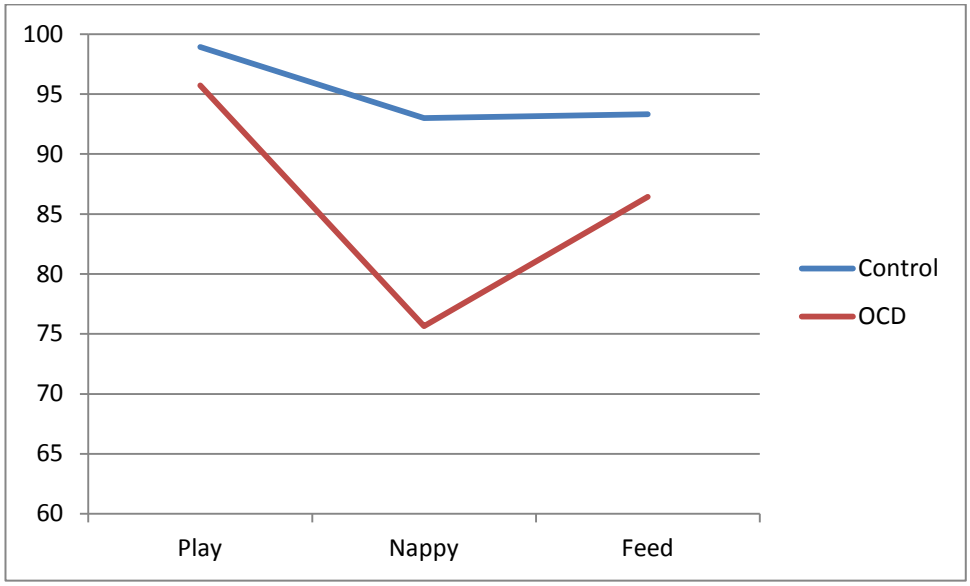


Figure 15: Maternal vocalizations across tasks at six months

T tests revealed that OCD and controls differed on vocalisations during nappy change $t_{[48.18]} = 3.58$, $p<0.001$ but not the other tasks (play vocalisations: $t_{[43.61]} = 1.83$, $p=0.68$; feed vocalisations $t_{[59.81]} = 1.67$, $p=0.10$). OCD participants made significantly less vocalisations only during the nappy change.

6.4.2.4 Dyadic Synchrony

Synchrony across tasks was analysed using repeated measures ANOVA with task as the repeated factor (three levels) and group as the between groups factor. This revealed no interaction but significant main effects of task ($F_{[2,138]=}3.77$, $p=0.025$) and group ($F_{[1,69]=}10.18$, $p=0.002$) indicating that mothers with OCD differed from controls, and both groups showed different levels of synchrony relative to task.

6.4.2.5 Over-conscientiousness in interactions

Over-conscientious behaviour ratings across tasks were dichotomised into did and did not occur in any of the three tasks given the low frequency of these events.

Over-conscientious behaviour	**Control group N=37**	**OCD group N=37**	
Did occur	13	20	Fisher's exact 0.160
Did not occur	24	17	

Table 48: Presence of over-conscientious behaviours in interactions in control and OCD groups

Similar numbers of mothers in both groups displayed behaviour that could be construed as over conscientious.

6.4.2.6 Maternal and infant mood

Maternal and infant mood were assessed using three concurrent subscales, time sampled over the course of interactions for presence/absence within a particular 15 second segment. Therefore it was possible to score highly on any or all subscales.

Maternal mood

An omnibus ANOVA (3x3) was utilised to compare the three types of maternal mood (neutral/positive, flat, fussy/distressed) across tasks and between groups.

There was no third order interaction (group x task x emotion) ($F_{[4,276]=}1.498$, p=0.203).

There was an interaction between type of maternal mood and group ($F_{[2,138]=}7.573$, p=0.001) and an interaction between task and group ($F_{[2,138]=}5.039$, p=0.008).

There was no interaction between task and type of maternal mood ($F_{[2.96,204.12]}$=1.243, p=0.293).

There were main effects of maternal mood ($F_{[1.58, 109.58]}$=960.76, p<0.0001) and of group ($F_{[1,69]}$=8.77, p=0.004). There was no main effect of task ($F_{[1.41,96.91]}$=3.31, p=0.057).

Control mothers exhibited very little negative emotion (flat or anxious) in any tasks. They did not show any flat emotion on any task. Mothers with OCD showed flat mood and anxiety in some tasks.

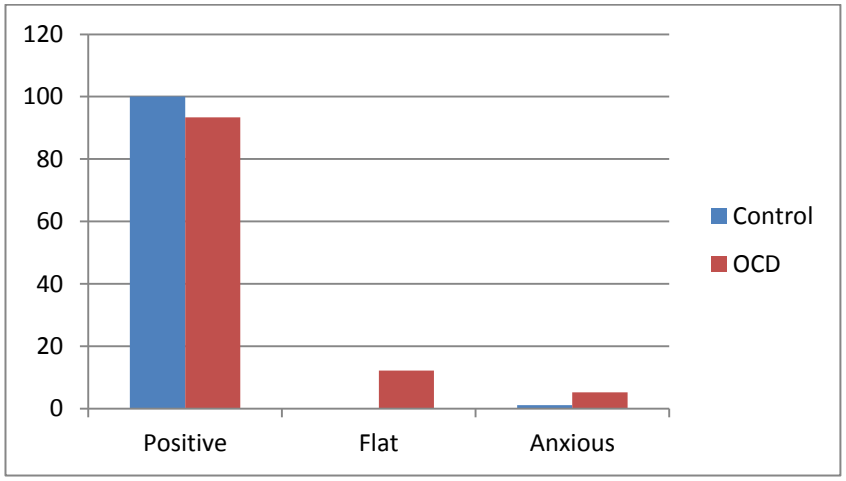


Figure 16: Mean percentage of three maternal emotions displayed across tasks in control and OCD groups

t tests revealed significant differences between the groups in the display of positive/neutral mood (t[35]=2.533, p=0.016) and flat mood (t[35]=-3.121, p=0.04) but not anxiety (t[42.76]=-1.998, p=0.52).

Infant mood

An omnibus ANOVA (3x3) was utilised to compare the three types of infant mood (neutral/positive, flat, fussy/distressed) across tasks and between groups.

There was no third order interaction (group x task x emotion) ($F_{[2.8,193.17]=}0.411$, p=0.801). There was no interaction between group and infant mood but there was an interaction between task and infant emotion ($F_{[2.8,193.17]=}3.94$, p=0.004).

There were main effects of task ($F_{[2,138]=}4.42$, p=0.016) and infant mood ($F_{[1.50, 103.85]=}1122.93$, p,0.0001) but not of group ($F_{[1,69]=}1.00$, p=0.321).

The infants showed significantly different frequencies of the three types of emotion and different tasks elicited particular emotions. However, this was not affected by group membership.

6.4.3 Expressed Emotion measured in the FMSS at six months

Expressed emotion was measured in the sample given the key role of responsibility appraisal in the psychopathology of OCD. Three mothers in the control group were rated as high EE compared with 12 in the OCD group. 2/3 in the control group were high based on critical comments compared with only 1/12 in the OCD group; the remainder of the OCD group were high EE on the basis of emotional over-involvement.

		Control group N=37	**OCD group N=37**	**Fisher's exact**
Low EE		34	25	0.019
High EE		3	12	
	Criticism	2	1	
	EOI	1	11	

Table 49: Distributions of EE ratings across OCD and control groups at six month

Other summary ratings for the five minute speech sample are presented below. With the exception of warmth which was rated on a 1-5 scale for the entire speech sample, scores for all other categories were the total number of comments made.

		Control group N=37 Mean (sd)	**OCD group N=37 Mean (sd)**	
Warmth 1-5 rating		3.19 (1.0)	3.05 (0.94)	$t_{[72]=}0.06$, p=0.55
Mind-minded comments		1.97 (0.80)	1.59 (0.87)	$t_{[72]=}1.95$, p=0.054
Negative impact on child		0.03 (0.16)	0.3 (0.70)	$^{\S}t_{[39.94]}$ = p=0.026*
Negative impact on mother		0.05 (0.33)	0.11 (0.39)	$t_{[72]}$ =-0.054 p=0.52
Positive impact on child		0.08 (0.28)	0.03 (0.16)	$^{\S}t_{[58.597]}$ =1.02, p=0.33
Positive impact on mother		0.32 (0.63)	0.19 (0.46)	$^{\S}t_{[66.26]}$ =1.06,p=0.294
Expressions of anxiety		0.16 (0.69)	0.89 (1.60)	$^{\S}t_{[49.94],}$ =-2.56, p=0.014*

§ denotes unequal variances; *p<0.05, ** p<0.01, ***p<0.001

Table 50: Mean ratings for FMSS additional codes in OCD and control groups at 6 months postpartum

Mothers with OCD therefore differed in making fewer mind-minded comments about the child (i.e. comments about the infants psychological state), they expressed more comments about negatively affecting their child and more comments expressing anxiety about their child.

6.5 Clinical Trial

6.5.1 Overview

The primary aims of the clinical trial were to examine the effect of intensive CBT delivered at six months on mother's symptomatology and mother-infant interactions at twelve months postpartum. The main research questions were whether intensive CBT was effective compared with treatment as usual and secondly, whether improvement in symptoms matched change in parenting variables including mother-infant interactions, attachment and related measures such as parenting self-efficacy.

To this end, the following section reports baseline scores followed by treatment data including pre-randomisation treatment experiences and detailed descriptions of TAU. Twelve month group comparison in psychopathology, maternal interactions, attachment and contextual variables are then reported.

Following this, limited exploratory analyses were carried out to examine (i) differences between the two OCD groups and controls on interactions at twelve months, (ii) predictors in the whole group of sensitivity at six months and twelve months and (iii) differences in maternal pathology and interactions according to secure and insecure mother-infant attachment.

6.5.1.1 Data analysis plan

The two groups were compared on baseline measures.

The hypothesis was made that ***mothers receiving immediate treatment will exhibit improvements (relative to waitlist controls) in obsessional symptoms (hypothesis 4) as measured by the two co-primary measures: the YBOCS as a clinician rated measure (Tolin, Abramowitz et al, 2005) and the OCI as a self-report measure (Abramowitz, Tolin et al, 2005)***. These outcome measures were assessed at 12 months postpartum, on average 3 months after the end of treatment for the CBT group. To test the hypothesis, t tests were used to compare groups at baseline on demographic and psychopathological variables. ANCOVAs, repeated measures ANOVAS and chi square tests were used as appropriate to assess treatment outcome.

It was also hypothesised that, ***at the point when treatment outcomes were compared, dyads where mothers were treated will show higher levels of maternal self-efficacy than those where mothers are not treated (hypothesis 5).*** This hypothesis was also tested using repeated measures ANOVA.

Following baseline assessment at six months, the two groups were randomized into immediate treatment or treatment as usual/wait list conditions. For ease of reading the two groups will henceforward be referred to in the text as CBT (immediate intensive CBT) and TAU (treatment as usual/wait list).

6.5.2 Between group baseline measures (six months postpartum)

Demographic and psychological variables in the two groups are presented below. The groups were compared on these variables to determine any important group differences at baseline that may be relevant to treatment outcome.

6.5.2.1 Demographic variables at baseline

The two groups did not differ on any demographic variables.

Variable	CBT N=17	Treatment as usual/wait list N=17	
Maternal age (s.d)	32.41 (5.89)	32.76 (4.32)	$t_{[32]}$ =-0.20, p=0.84
White Ethnicity	14	15	Fisher's exact=1.00
Educated to degree level or above	11	12	Fisher's exact=1.00
% Single parent	0	0	Fisher's exact=1.00
% first time parent	11 (64.7)	10 (58.8)	Fisher's exact=1.00
% male child	9 (52.9)	8 (47.1)	Fisher's exact=1.00

[$] denotes unequal variances; *p<0.05, ** p<0.01, ***p<0.001

Table 51: Comparison of baseline demographic characteristics in CBT and TAU groups

6.5.2.2 Obsessional psychopathology at baseline

The groups were compared on measures of obsessional psychopathology and related characteristics of their OCD. The groups differed significantly only on the RAS scale, measuring the associated construct of responsibility appraisals. The effect size of this difference was 0.78 (Cohen's d). However, the mean for both groups was consistent with published means for clinical OCD samples (e.g. 121.9 in (Salkovskis, Wroe et al. 2000).

Variable	CBT N=17	Treatment as usual/wait list N=17	
OCPD diagnosis at 6m	1	2	Fisher's exact =1.00
Age of first OCD interference	26.82 (9.96)	24.18 (6.20)	$t_{[32]}$ =-0.93, p=0.36
New diagnosis of OCD related to this child	9	4	Fisher's exact =0.16
Concerns are not directly related to the infant	4	1	Fisher's exact =0.34
OCI total score	53.88 (23.11)	61.82 (27.95)	$t_{[32]}$ =-0.90, p=0.37
YBOCS total score	24.82 (5.19)	24.47 (5.81)	$t_{[32]}$ =-0.19, p=0.85
RAS score	123.35 (30.49)	142.06 (14.60)	$^{\S}t_{[22.9]}$ =-2.28,p=0.03
Time troubled by OCD daily (hours)	9.53 (8.30)	9.69 (7.44)	$t_{[32]}$ =-0.06, p=0.95

§ denotes unequal variances *p<0.05, ** p<0.01, ***p<0.001

Table 52: Comparison of baseline obsessional psychopathology in CBT and TAU groups

The distribution of OCD symptom subtypes was examined between groups. Fears of deliberate harm and contamination comprised the two most predominant OCD subtypes in both groups. There were more varieties of subtypes of OCD in the CBT group (6 vs 3).

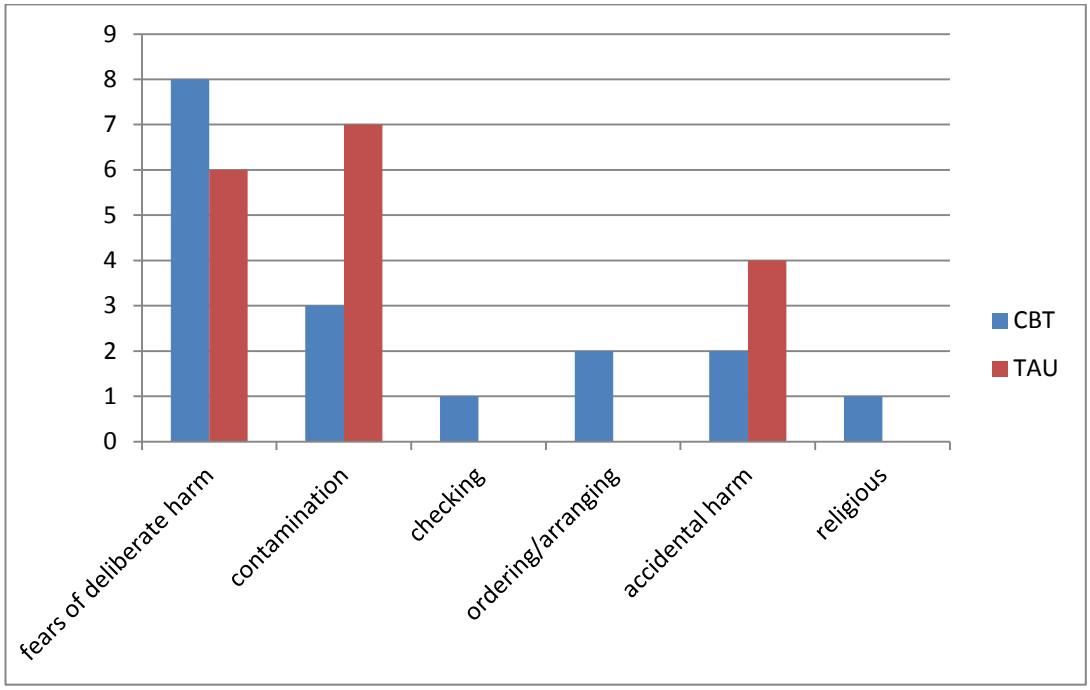


Figure 17: Predominant OCD symptom according to the SCID in CBT and TAU groups at baseline

6.5.2.3 Other psychopathology at baseline

The groups were also compared for levels of depression and general anxiety on the DASS and overall self-rating of anxiety. The groups differed on DASS anxiety with an effect size of 0.72 (Cohen's d).

Variable	**CBT N=17**	**Treatment as usual/wait list N=17**	
DASS stress	21.53 (10.37)	27.59 (10.13)	$t_{[32]}$ =-1.72, p=0.09
DASS anxiety	10.88 (7.43)	17.35 (10.31)	$t_{[32]}$ = -2.10, p=0.04*
DASS depression	17.00 (11.26)	20.59 (16.02)	$t_{[28.7]}$ =-0.76, p=0.45
Anxiety overall distress (0-8)	6.06 (1.30)	6.59 (1.37)	$t_{[32]}$ = -1.15, p=0.26

Table 53: Baseline comparison of measures of general psychopathology in CBT and TAU groups

The groups were also compared for past and current diagnoses apart from OCD with no significant differences being found.

Variable		**CBT N=17**	**Treatment as usual/wait list N=17**	**Fisher's exact: Ever v Never**
Depression (major or minor)	Current	4	4	0.72
	Past only	6	8	
	Never	7	5	
Panic disorder	Current	0	2	0.66
	Past only	4	0	
	Never	13	15	
Social Phobia	Current	1	1	1.00
	Never	16	16	
Agoraphobia	Past only	0	1	1.00
	Never	17	16	
Simple phobia	Current	2	5	0.22
	Past only	0	1	
GAD	Current	1	3	1.00
	Past only	1	0	

Table 54: Baseline comparison of SCID diagnoses in CBT and TAU groups

Overall the groups were similar in terms of the severity of current obsessional psychopathology, depression and past and current diagnoses. However, there were higher levels of general anxiety reported in the TAU group.

6.5.2.4 Infant temperament and contextual variables at baseline

Variable	CBT N=17	Treatment as usual/wait list N=17	T, p (where significant)
Social support scale	44.41 (12.82)	48.81 (12.38)	$t_{[32]}$ =-1.23, p=0.23
GRIMS scale	29.32 (7.73)	26.47 (11.41)	$t_{[32]}$ =0.75, p=0.46
BATES fussy-difficult	20.12 (5.51)	17.35 (6.24)	$t_{[32]}$ =1.37, p=0.18
BATES unadaptable	8.59 (3.24)	9.88 (5.58)	$t_{[25.70]}$ =-0.83, p=0.42
BATES dull	-0.88 (2.69)	-1.06 (2.01)	$t_{[32]}$ =0.22, p=0.83
BATES unpredictable	8.94 (3.42)	8.09 (2.54)	$t_{[32]}$ =0.83, p=0.42

Table 55: Baseline comparison of general variables and infant temperament for CBT and TAU groups

6.5.2.5 Parenting perception variables at baseline (six months postpartum)

Variable		CBT N=17	TAU N=17	
Parenting self-efficacy Scale		83.93 (15.36)	81.81 (15.49)	$t_{[29]}$ =0.38, p=0.71
Mean perceived impact (0-100) of OCD on…	..ability to meet baby's physical needs	18.82 (26.67)	19.41 (23.57)	$t_{[32]}$ =0.07, p=0.95
	..ability to meet baby's emotional needs	20.29 (19.72)	25.88 (24.51)	$t_{[32]}$ =-0.73, p=0.47
	..ability to have fun and enjoy being with baby	40.00 (23.78)	48.82 (31.20)	$t_{[32]}$ =-0.93, p=0.36

	..parenting overall	48.24 (30.62)	61.18 (25.71)	$t_{[32]}$ =-1.34, p=0.95
Impact of being parent on symptoms of OCD (0-100)		72.06 (30.98)	72.65 (23.73)	$t_{[32]}$ =-0.06, p=0.95
Enjoyment of play (0-4)		3.35 (0.70)	3.31 (0.87)	$t_{[32]}$ =0.15, p=0.88
Enjoyment of nappy change (0-4)		2.00 (0.61)	1.71 (0.99)	$t_{[32]}$ =1.05, p=0.30
Enjoyment of feed (0-4)		2.59 (1.18)	2.59 (1.06)	$t_{[32]}$ =0.00, p=1.00

Table 56: Parenting variables at baseline

Overall the groups were well matched on demographic and symptomatic variables at baseline.

6.5.3 Pre-trial and trial treatment data

The focus of the study was the impact of OCD and the possible ameliorating effect of treatment on maternal and interactional outcomes between 6 and 12 months postpartum. 16/17 mothers in the immediate treatment group completed treatment at the six month timepoint. One mother started but did not complete treatment. However, she provided assessment data. Therefore all mothers in both groups participated in the twelve month assessment so the trial represented full intention to treat.

All mothers participating in the study who were randomized to TAU were offered treatment for ethical reasons at twelve months, so longer follow up was not possible. In the TAU group 13/17 mothers completed treatment after the second assessment. 3 did not wish to take up treatment (1 of whom had recovered). One

mother started but did not complete treatment at twelve months. The treatment data in the TAU group is not reported here.

6.5.3.1 Pre-trial treatment experiences for women with postnatal OCD

Prior to randomization, all participants were asked to give a history of treatment experiences at six months, particularly in relation to seeking help in the postnatal period. By definition, mothers wanting to participate in the trial had not had successful treatment and met clinical criteria for OCD when their babies were at the six month point and they agreed to randomisation.

Full details of postnatal treatment experiences of mothers are provided in Appendix 6.

In summary, at baseline (6 months postpartum) all mothers had been in contact with services to seek help for anxiety in the postnatal period. However, two mothers had not felt able to disclose their symptoms (intrusive thoughts) to their GP. A number of negative or unhelpful reactions were reported by mothers when they disclosed symptoms of OCD. Concern from a professional of increased risk to the infant was reported by three mothers, two of whom had been reported to social services as a result of disclosing their symptoms. One, who was resident in an inpatient mother and baby unit, had an ongoing assessment of 'high risk' and was not allowed to be alone with her baby at the time of the six month assessment; the other mother was reported to social services by a health visitor without her knowledge when her baby was four months old but it had not been taken further.

Other mothers reported minimization of symptoms by GPs and health visitors. Misdiagnosis of the problem as postnatal depression was reported by four mothers.

19/34 (55.8%) mothers were taking some form of medication at 6 months. These were Citalopram (5), Citalopram +Quetiapine (1), Quetiapine (1), Sertraline (5), Sertraline +Diazepam (1), Amitryptaline (2), Fluoxetine (2),Venlafaxine +Olanzapine (1), Seroxat +Beta-blockers (1).

Therefore SSRIs were being taken by 14 mothers, SNRI by 1, tricyclic antidepressant by 2, antipsychotic or antipsychotic augmentation by 3 mothers (a further mother had declined augmentation), with two taking other medication not recommended for long term use in anxiety (Diazepam and beta-blockers).

15/34 mothers either declined to take medication or only took medication for a short time.

5/34 (14.7%) mothers had received sessions of individual CBT in the six months following birth. However, for four mothers this was only partly helpful and for the remaining two it had been unhelpful. A further 5 mothers (14.7%) were on a waiting list for CBT. 32% of the total sample had therefore accessed or were going to access CBT. However, for those who had had received any CBT (11.8%), by definition it had not been successful, as they remained highly symptomatic at six months.

5/34 (14.7%) had received other input including supportive visits from a member of a perinatal or community mental health team.

A number of mothers had received psychological help not recommended by the NICE guidelines. 3 had received counseling and another mother was awaiting counseling. 4 had taken part in therapy groups (general CBT, mindfulness and a general OCD support group).

	CBT		**TAU**	
	0-6m	**6-12m**	**0-6m**	**6-12m***
Medication	9	8	11	10
Any individual CBT	2	1	3	6
Helpful				2
Partly helpful	2		2	3
Unhelpful		1	1	1
Other psychological input	3	4	7	3
Helpful				
Partly helpful	1	2	4	2
Unhelpful	2	2	3	1
No treatment	5	-	1	2

*12m data missing for one participant

Table 57: Treatments received by both groups from birth to six months and six to twelve months.

Note that intensive CBT started for the CBT group at 6 months postnatal.

6.5.3.2 Treatment experiences for mothers in the TAU group of the treatment trial 6-12 months

Treatments received between six and twelve months was documented in both groups. In the TAU group, 6/16 (37.5%) women received some CBT, 5 of whom described it as helpful or partly helpful. A further three had received other psychological input (a mindfulness group for one mother and general counseling for two mothers).

One woman in the CBT group had commenced CBT with local services just before starting the six month assessment point which she was finding helpful. She continued the two final sessions of CBT after the intensive treatment, and she did not find the final CBT sessions helpful. Therefore she is included in both 0-6m and 6-12m categories. No other participants in the CBT group received CBT (or had sought CBT).

Similar numbers in each group were on psychotropic medication between 6 and 12 months.

The treatment study therefore compared standard management plus intensive CBT with standard management alone.

6.5.3.3 Treatment individual scores for immediate CBT group

Individual YBOCS scores for the immediate CBT group before and after the end of the two-week treatment and at twelve months are shown below.

	PRE (6m)	POST (7m approx.)	FOLLOW UP (12m)
1	26	11	6
2	25	16	6
3	32	21	27
4	22	11	13
5	30	29	23
6	20	11	12
7	23	5	6
8	29	26	24
9	31	30	27
10	34	Dropped out	30
11	27	17	13
12	17	15	3
13	20	19	12
14	17	6	5
15	26	19	12
16	23	12	8
17	20	10	6

Table 58: Pre, post and follow up YBOCS scores for the CBT group.

The post treatment YBOCS was administered by the treating clinician, and the twelve month YBOCS was conducted by a researcher blind to group membership.

	PRE (6m)	POST (7m approx.)	FOLLOW UP (12m)
1	67	11	28
2	45	44	10
3	53	37	37
4	43	18.4*	10
5	89	82*	77
6	51	45	16
7	27	5	3
8	78	67	48
9	27	22	26
10	56	Dropped out	80
11	77	52	23
12	27	22	3
13	92	61	40
14	25	11	7
15	66	34	22
16	70	22	8
17	23	14	7

* one missing item imputed from mean

Table 59: Pre, post and follow up treatment OCI scores for CBT group

The majority of mothers improved after the two-week intensive treatment and gains were at least maintained at 12 months. Some mothers (e.g. case 1 and 9) slipped back slightly in YBOCS or OCI scores between the end of treatment and the twelve month follow up. The mother who dropped out of treatment in the CBT group deteriorated between the six and twelve month assessments according to OCI score, and remained high on her YBOCS score.

6.5.4 Impact of CBT on maternal symptomatology

6.5.4.1 Obsessive-compulsive symptomatology

Summary data for the two primary outcome variables across the groups is presented below.

Variable		CBT N=17	TAU N=16
YBOCS	6 month	24.82 (5.20)	24.47 (5.81)
	12 month	13.71 (8.95)	20.88 (6.34)
OCI	6 month	53.88 (23.11)	61.82 (27.95)
	12 month	26.18 (23.80)	52.23 (30.96)

Table 60: Mean (sd) OCI and YBOCS scores at 6m and 12m in CBT and TAU groups

Change in YBOCS score between the two assessment points was taken as the primary outcome measure for maternal treatment. In order to test the effect of treatment on YBOCS scores a mixed model ANOVA with time as the repeated factor and group as the between group factor was conducted.

A significant main effect was found for time ($F_{[1,31]}$=58.4, p<0.001), but not group ($F_{[1,31]}$=2.37, p=0.13). Results indicated a significant group by time interaction ($F_{[1,31]}$=16.2, p<0.0001).

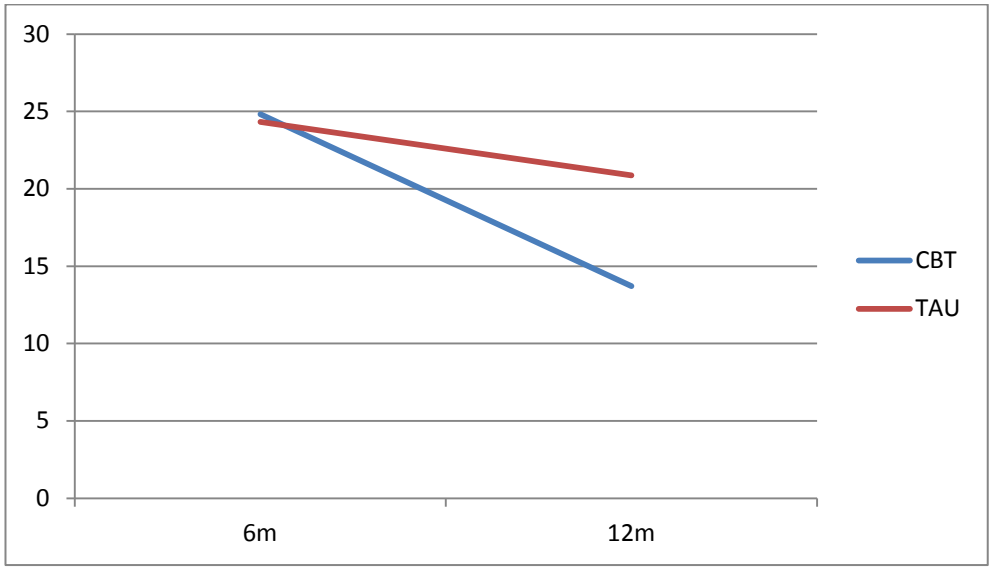


Figure 18: Change in YBOCS total scores according to group

A further analysis of the two YBOCS subscales, obsessions and compulsions, was conducted to ascertain if obsessions or compulsions were affected differentially by treatment.

An omnibus ANOVA (2x2 mixed model) was conducted to determine if there were differences between the two groups for the two subscales over time. There was a main effect of time ($F_{[1, 31]}$=58.35, p<0.001) but not group ($F_{[1, 31]}$=2.17, p=0.13). Only the interaction between time and group was significant ($F_{[1,31]}$=16.25, p<0.001) and there was not a significant three-way (subscale by group by time) interaction ($F_{[1, 31]}$=1.89, p=0.179). This result suggests that the change in obsessions and compulsions was of a similar magnitude.

Percentage change in individual YBOCS scores are presented below. Data was not available for one participant in the TAU group. All of the mothers in the CBT group improved between 6m and 12m.

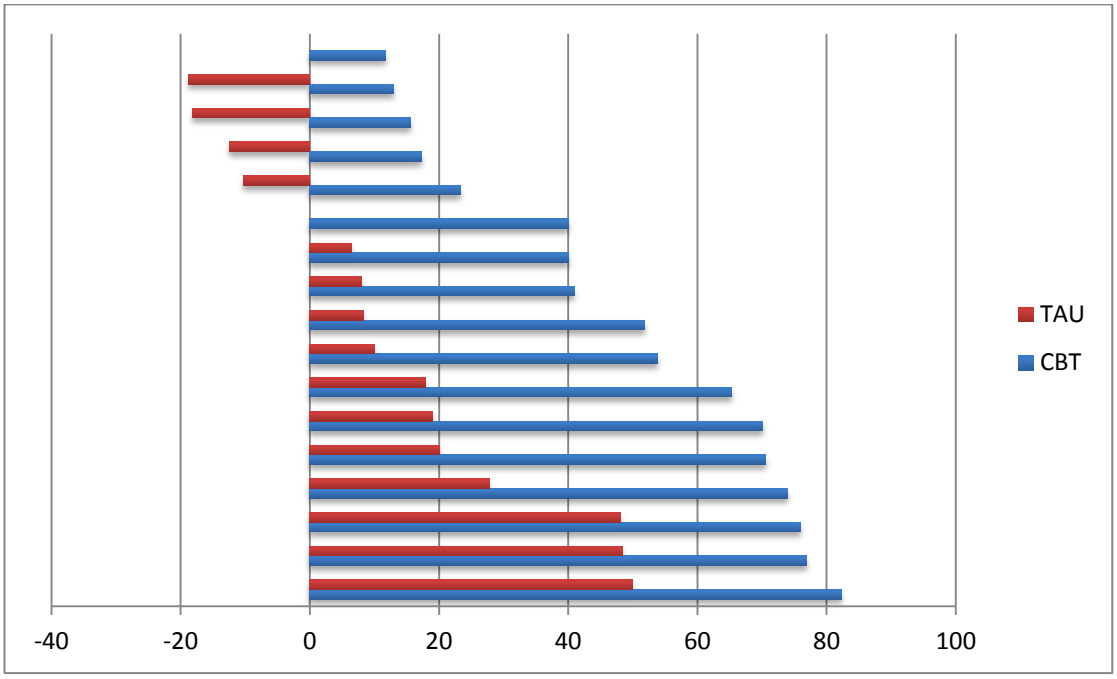


Figure 19: Percentage change in YBOCS scores between 6m and 12m for all clinical cases

The mean YBOCS improvement in the CBT group was 48.4% (sd = 25.2) and in the TAU group was 12.8% (sd= 22.6), which represented a significant difference ($t_{[31]}$=4.27, p<0.0001). According to the criteria of Tolin et al (Tolin, Abramowitz et al. 2005), a 30% change on the YBOCS is considered clinically meaningful. This occurred in 12/17 of the CBT group and 3/16 of the TAU group, which represented a significant difference (Fisher's exact test, p=0.005).

This represents a between subjects effect size of Cohen's d=1.32 (adjusted according to Cohen, 1988) using 12 month YBOCS total scores and pre-treatment standard deviations.

Change in OCI score between the two assessment points was taken as the second primary outcome measure for maternal treatment. In order to test the effect of

treatment on OCI scores a repeated measures ANOVA with time as the repeated factor and group as the between group factor was conducted.

This indicated a significant main effect of time ($F_{[1, 32]}$=35.9, p<0.0001) but not of group although this was a non-significant trend ($F_{[1, 32]}$=3.91, p=0.057). There was however a significant interaction of time by group ($F_{[1, 32]}$=8.4, p=0.007) which allowed subsequent multiple comparisons. The mean absolute change in OCI total score in the CBT group was 27.71 (20.95) and in the TAU group was 9.59 (14.85) which was significant ($t_{[32]}$ =2.91, p=0.007).

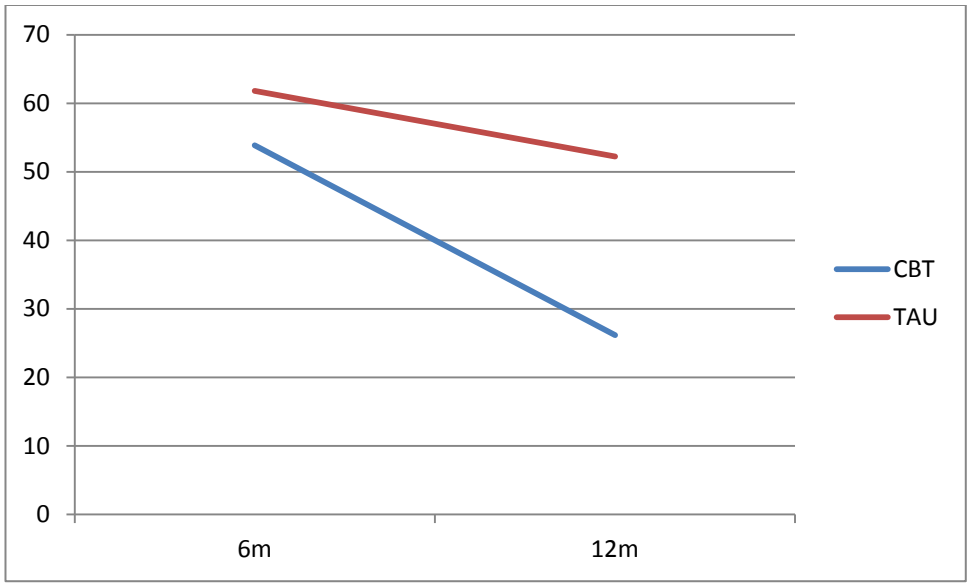


Figure 20: Changes in OCI scores according to group

An omnibus ANOVA (2x2 mixed model) was conducted to determine if there were differences between the two groups for the three main OCI subscales of washing checking and obsessions over time. This indicated significant main effects for time ($F_{[1, 32]}$=32.02, p<0.0001) and subscale (Greenhouse Geisser $_{[1.5]}$=7.73, p=0.003) and group ($F_{[1, 32]}$=3.63, p=0.015). There were significant interactions between time and

group ($F_{[1, 32]}$=10.4, p=0.003), time and subscale ($F_{[2, 32]}$=4.0, p=0.02) and a three-way interaction between time, subscale and group ($F_{[1, 32]}$=5.0, p=0.01).

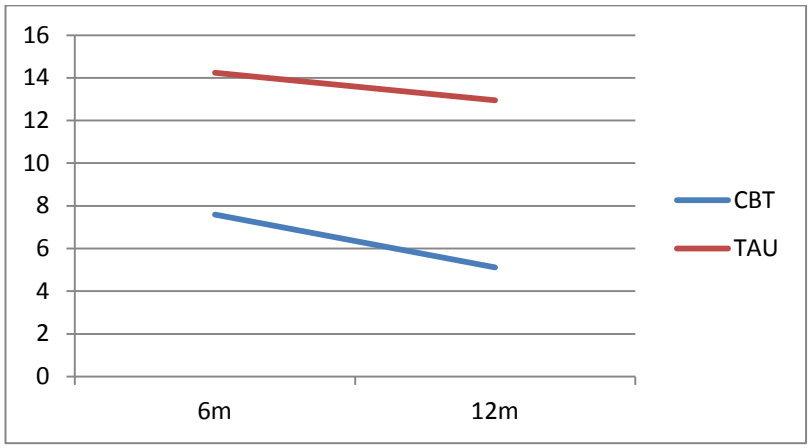


Figure 21: changes in OCI washing according to group

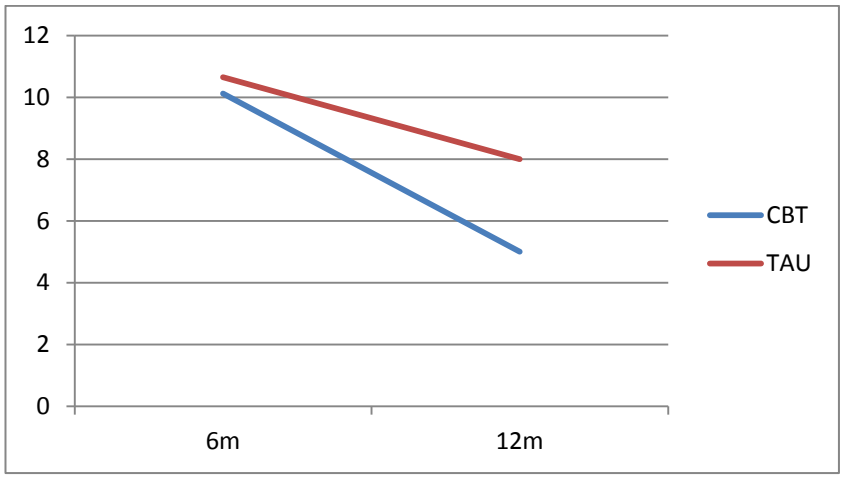


Figure 22: Changes in checking OCI subscale according to group

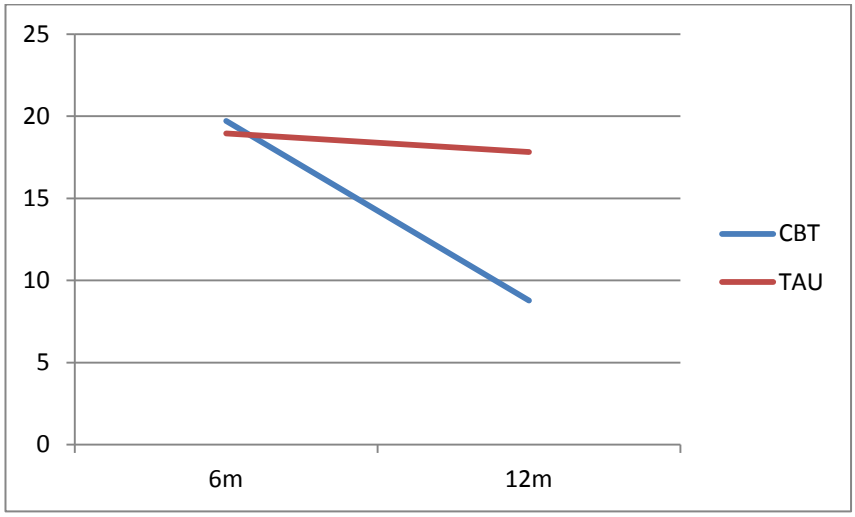


Figure 23: Changes in OCI obsessions subscale according to group

Due to this interaction, three 2x2 repeated measures ANOVAs were conducted to assess simple effects. For OCI washing scores at 6m and 12m there was a main effect of time ($F_{[1, 32]}$=6.14, p=0.019) but not of group ($F_{[1, 32]}$=3.34, p=0.07) but no interaction ($F_{[1, 32]}$=0.60, p=0.44). For OCI checking scores similarly there was a main effect of time ($F_{[1, 32]}$=10.45, p=0.003) but not of group ($F_{[1, 32]}$=0.5, p=0.482) but no interaction ($F_{[1, 32]}$=1.06, p=0.311). For OCI obsessions scores there was a main effect of time ($F_{[1, 32]}$=22.722, p<0.0001) but not of group ($F_{[1, 32]}$=2.995, p=0.093) and there was a significant interaction ($F_{[1, 32]}$=15.08, p<0.0001), suggesting that change in obsessions was most affected by treatment.

The mean percentage OCI improvement in the CBT group was 54.45% (35.62) and in the TAU group was 14.77% (23.37). This was also a significant difference ($t_{[32]}$ =3.84, p=0.001).

This represents a between subjects effect size of Cohen's d=1.90 (adjusted according to Cohen, 1988) using 12 month YBOCS total scores and pre-treatment standard deviations.

Given the differences in group constitution according to main symptom, mean OCI and YBOCS change scores in mothers with fears of deliberate harm and contamination are presented below. Given the small numbers in each subgroup, no additional statistical analyses were carried out.

Variable	**CBT**		**TAU**	
Fears of deliberate harm (OCI change)	N=8	21.63 (11.92)	N=6	2.17 (10.89)
Fears of deliberate harm (YBOCS change)		13.13 (5.96)	N=5	7.00 (7.78)
Contamination fears (OCI change)	N=3	42.67 (12.06)	N=7	8.14 (12.98)
Contamination fears (YBOCS change)		11.00 (5.20)		0.29 (3.30)

Table 61 : Mean change scores according to symptom subtype in CBT and TAU groups

In terms of SCID diagnosis, more participants in the CBT group lost the diagnosis of OCD at 12m compared with the TAU group although this was not statistically significant (Fisher's exact=0.057).

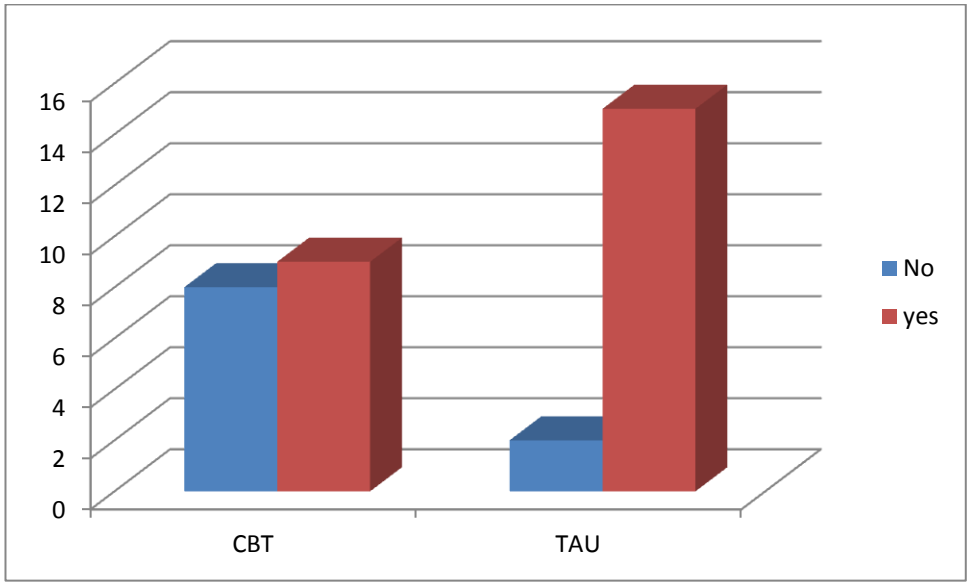


Figure 24: OCD diagnosis at 12m in CBT and TAU groups

Given a significant difference at baseline, a t test was used to compare **Responsibility Attitudes Scale** change scores. This was significant $t_{[32]}$ =-2.91, p=0.007 indicating a greater degree of change in the CBT group.

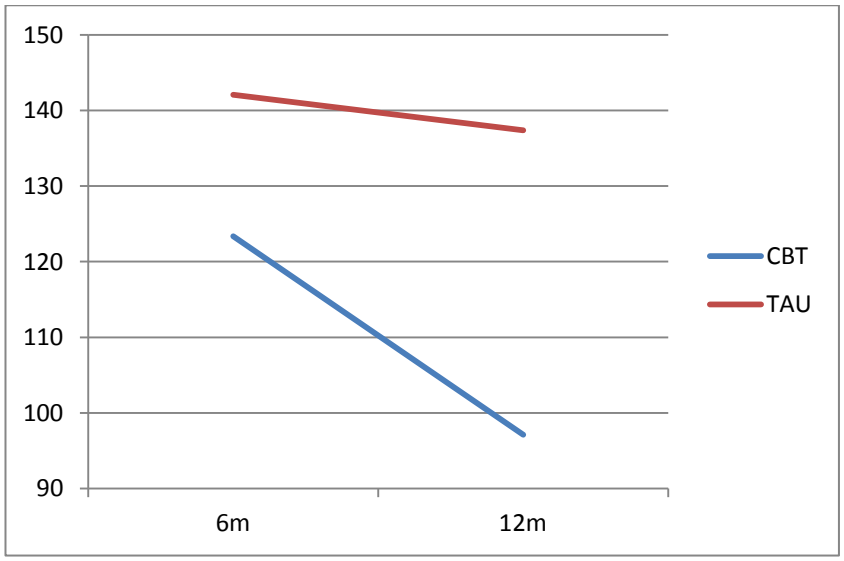


Figure 25: Changes in RAS scores in CBT and TAU groups

6.5.4.2 Anxious and depressive symptomatology

Change in general anxiety using the anxiety subscale of the **DASS** was analysed using repeated measures ANOVA and there was a main effect of time ($F_{[1,32]=}$19.4,

p<0.0001) and group ($F_{[1,32]}$ =8.53, p=0.006) reflecting the initial difference in scores, but no significant time by group interaction ($F_{[1,32]=}$0.53, p=0.47).

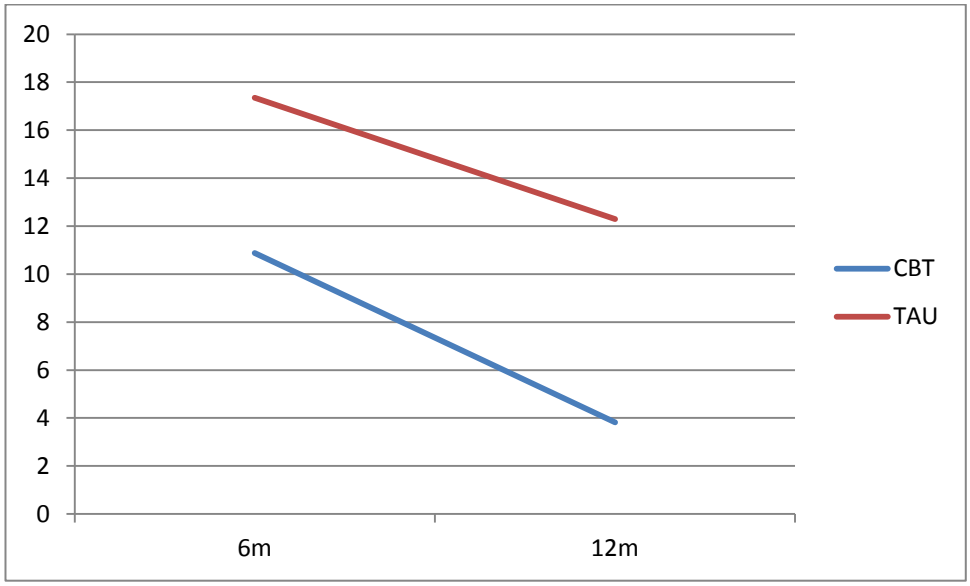


Figure 26: Changes in DASS anxiety in CBT and TAU groups

Similar results were found for changes in the DASS depression subscale with a main effect for time ($F_{[1,32]=}$23.54, p<0.0001) but not of group ($F_{[1,32]=}$2.15, p=0.15) and no interaction ($F_{[1,32]=}$1.54, p=0.22).

Therefore treatment did not have a statistically significant effect on the change in anxiety and depression scores.

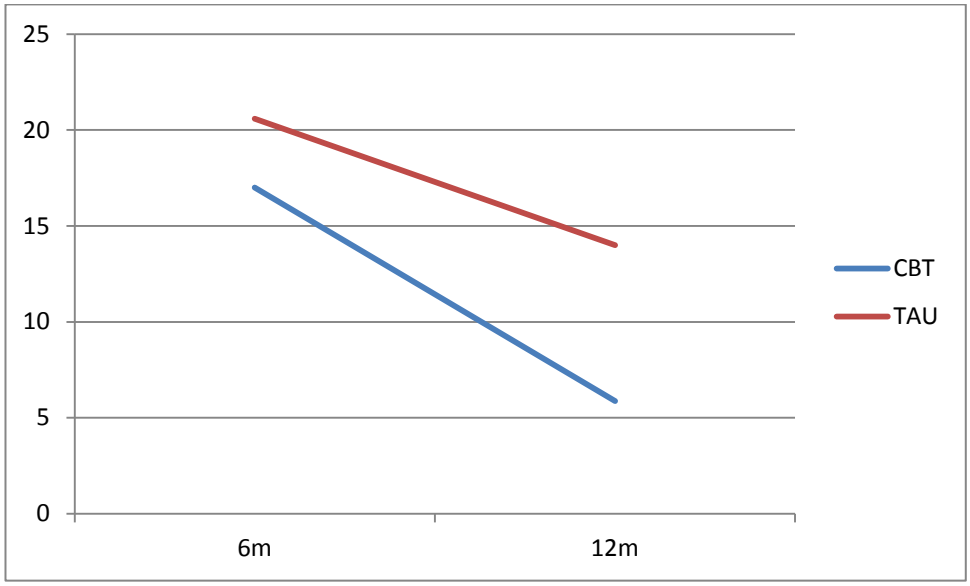


Figure 27: Changes in DASS depression in CBT and TAU groups

However, mothers in the CBT group began and remained lower in anxiety and depression than mothers in the TAU group.

6.5.5 Impact of CBT on mother-infant interactions

6.5.5.1 Summary of change in mother-infant interactions between six and twelve months

Mean change scores in each group are presented below.

Variable	CBT N=16	TAU N=16
Ainsworth sensitivity change	0.18 (1.16)	0.21 (1.12)
Ainsworth cooperation-interference change	0.06 (0.78)	-0.02 (0.79)
Maternal warmth change	-0.15 (1.16)	0.15 (0.83)
Maternal vocalizations change	-6.24 (16.97)	-0.50 (10.97)

Dyadic synchrony change	-0.02 (0.78)	-0.04 (0.79)

Table 62: Mean change scores in interaction variables in CBT and TAU groups

Analysis of the data for the component scales of mother-infant interactions is presented below.

6.5.5.2 Ainsworth Scales

Video data was available for 16 mothers in each group. An omnibus ANOVA (2x2x3 mixed model) was used to examine differences in Ainsworth Scale scores (sensitivity and cooperation-interference) over time, between groups and over different parenting tasks.

There was no main effect of time ($F_{[1,30]} = 0.379$, p=0.543) or scale ($F_{[1,30]} = 2.526$, p=0.122) but there was a main effect of task ($F_{[2,60]} = 5.787$, p=0.005). There was no main effect of group ($F_{[1,30]} = 0.028$, p=0.879).

There was an interaction between scale and task ($F_{[2,60]} = 4.035$, p=0.023). There were no other significant two way interactions.

There was a third order interaction between time, scale and task ($F_{[2,60]} = 5.541$, p=0.006) indicating that the tasks at different infant ages elicited different levels of sensitivity and cooperation/intrusiveness. There were no other third order interactions and there was not a fourth order interaction, indicating that group membership had no effect at either timepoint on sensitivity or cooperation/interference in any task.

6.5.5.3 Warmth scores

Changes in warmth ratings by group and over time and parenting situation were analysed using a repeated measures ANOVA (2x3) with treatment group as the between subjects variable.

There was no third order interaction ($F_{[2,60]}$ =0.147, p=0.864)

There was no interaction between time and group ($F_{[1,30]}$ =0.666, p=0.421),

time and task ($F_{[1.641,49.216]}$ =0.208, p=0.769), task and group ($F_{[2,60]}$ =2.338, p=0.105)

There was no main effect of time ($F_{[1,30]}$ =0.000, p=1.000) or group ($F_{[1,30]}$ =0.085 p=0.773).

Only a main effect of task was found ($F_{[2,60]}$ = 7.064, p=0.002).

6.5.5.4 Maternal vocalisations

Changes in maternal vocalisations by group and over time and parenting situation were analysed using a repeated measures ANOVA (2x3) with treatment group as the between subjects variable.

There was no third order interaction ($F_{[2,60]}$ =0.249, p=0.780)

There was no interaction between time and group ($F_{[1,30]}$ =1.290, p=0.265),

time and task ($F_{[2,60]}$ =1.161, p=0.320), task and group ($F_{[2,60]}$ =1.489, p=0.234)

There was no main effect of time ($F_{[1,30]}$ =1.781, p=0.192) or group ($F_{[1,30]}$ =0.002, p=0.967).

Only a main effect of task was found ($F_{[1.57,47.09]}$ =14.132, p<0.0001).

6.5.5.5 Dyadic synchrony

Changes in synchrony ratings by group and over time and parenting situation were tested using a repeated measures ANOVA (2x3) with treatment group as the between subjects variable.

There was no third order interaction ($F_{[2,60]}$ =0.704, p=0.499).

There was no interaction between time and group ($F_{[1,30]}$ =0.006, p=0.941).

time and task ($F_{[2,60]}$ =0.560, p=0.574), task and group ($F_{[2,60]}$ =0.097, p=0.908).

There was no main effect of time ($F_{[1,30]}$ =0.051, p=0.824) or group ($F_{[1,30]}$ =0.037, p=0.849). Only a main effect of task was found ($F_{[2,60]}$ =4.506, p=0.015).

In summary, the tasks appeared to have different characteristics that elicited different levels of sensitivity and other interactive factors.

6.5.5.6 Over-conscientiousness in interactions

Overconscientious behaviour was identified at very similar rates at twelve months: 10/17 of mothers in the CBT group and 8/16 in the TAU group (Fisher's exact=0.732). The rates were similar at 6 months with 7/17 mothers in the CBT group and 8/17 mothers in the TAU group exhibiting these behaviours in at least one situation (Fisher's exact=1.00).

Overall, treatment had no effect on any mother-infant interaction scores.

6.5.6 Relationships between changes in psychopathology and sensitivity

In order to examine relationships with changes in obsessional symptomatology and other symptomatology, correlations between symptomatic change scores and sensitivity change scores in the whole OCD sample were calculated.

	Sensitivity change	**OCI change**	**YBOCS change**	**DASS depression change**
OCI change	0.09, p=0.62			
YBOCS change	-0.08, p=0.66	0.55, p<0.0001***		
DASS depression change	0.25, p=0.27	0.50, p<0.0001***	0.49, p=0.004**	
DASS anxiety change	0.13, p=0.48	0.16, p=0.37	0.40, p=0.02*	0.68, p<0.0001***

*p<0.05, ** p<0.01, ***p<0.001

Table 63: Intercorrelations between symptom and interaction change scores in the combined OCD groups

Change in sensitivity was not related to change in any of the psychopathological variables.

6.5.7 Impact of CBT on mother-infant attachment as measured by the Strange Situation Procedure

It was hypothesised that mothers in the CBT group would have fewer insecurely attached infants than mothers in the TAU group (hypothesis 3). Strange situation data was available for 28/34 mothers (82% of the whole sample) and for 14 in each group. Those for whom data was not available were unable to travel to London with their baby for the procedure.

	CBT (n=14)	**TAU (n=14)**	**Total (%)**	**Fisher's exact test**
Avoidant (A)	3	3	6 (21.4)	1.00
Secure (B)	10	10	20 (71.4)	1.00
Anxious/resistant (C)	1	0	1 (3.6)	1.00
Disorganised (D)	0	1*	1 (3.6)	1.00

*This infant was categorised with an underlying strategy of C1 (anxious-resistant)

Table 64: Four-category distribution of strange situations in the CBT and TAU groups

There were no group differences in any category. Therefore treatment had no effect on attachment categorizations at twelve months.

6.5.8 Impact of CBT on parenting perceptions and contextual variables

Given clear changes in OCD symptomatology according to group, changes in key general variables were examined and significant time by group interactions were predicted.

Change in the **self-efficacy questionnaire** was examined using repeated measures ANOVA but no main effect was found for time ($F_{[1,32]}$ =1.38, p=0.25) or group ($F_{[1,32]}$ =0.67, p=0.42) and there was no interaction ($F_{[1,32]}$ =0.48, p=0.49).

Self ratings of **home management impairment** due to anxiety (on the Work and Social Adjustment Scale) indicated a main effect of time $F_{[1, 30]}$ =23.5, p< 0.0001 and time by group interaction ($F_{[1, 30]}$ = 5.4, p=0.03). This indicates that there was greater improvement in the treatment group.

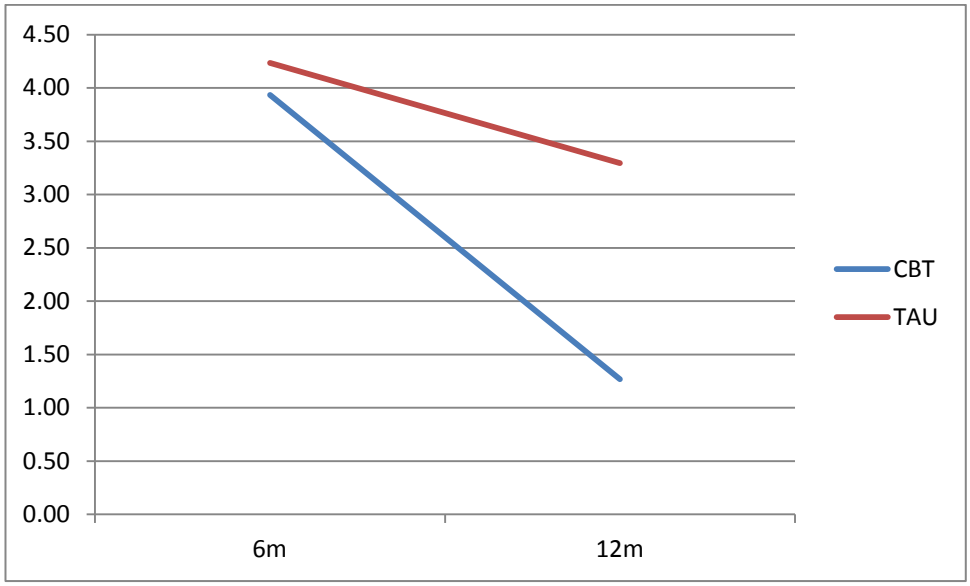


Figure 28: Change in interference in home management ratings from 6m to 12m in CBT and TAU groups

There was no main effect of time on **GRIMS** marital satisfaction measure ($F_{[1,32]}$ =1.03, p=0.32) , no main effect of group ($F_{[1,32]}$ =0.16, p=0.69) and no time by group interaction ($F_{[1,32]}$ =1.64, p=0.21).

The two most relevant subscales on the **PAAQ** were chosen for analysis - role reversal and vulnerability. There was a significant effect of time on the **role reversal subscale** of the **PAAQ** ($F_{[1, 32]}$ = 6.8, p=0.02) with scores rising over time in

both groups, but no main effect of group ($F_{[1,32]}$ =1.98, p=0.17) and no significant interaction. The **vulnerable subscale** did not show a main effect of time ($F_{[1,32]}$ =0.01, p=0.91), group ($F_{[1,32]}$ =0.33, p=0.57) or demonstrate a time by group interaction ($F_{[1,32]}$ =0.19, p=0.67).

Items of the **parenting perception scale (PPS)** which required mothers to rate the impact of their OCD on specific domains of parenting were analysed for changes according to group. Higher scores represent a greater perceived impact. Mean scores and standard deviations at six and twelve months are presented below for four ratings of impact on domains of caring for a child.

Variable at 12m		**CBT N=17**		**TAU N=17**	
		6m	**12m**	**6m**	**12m**
Mean perceived impact (0-100) of OCD on…	..ability to meet baby's physical needs	18.82 (26.66)	6.47 (8.62)	19.41 (23.58)	18.82 (23.67)
	..ability to meet baby's emotional needs	20.29 (19.72)	11.76 (18.45)	25.88 (24.51)	23.24 (29.31)
	..ability to have fun and enjoy being with baby	40.00 (23.78)	18.82 (25.22)	48.82 (31.20)	43.53 (32.59)
	..parenting overall	48.24 (30.62)	20.59 (25.61)	61.18 (25.71)	41.76 (28.99)

Table 65: Maternal perceptions of the impact on parenting at 12m

An omnibus ANOVA (4x2x2 mixed model) was conducted to examine the impact of treatment on particular aspects of parenting.

There was no significant third order interaction ($F_{[3,96]}$=0.348, p=0.790)

There was a significant interaction between time and item (Greenhouse Geisser $_{[2.3]}$, 5.0, p=0.003), but no significant interactions between either group and time ($F_{[1, 32]}$=2.82, p=0.10) or group and item ($F_{[3,96]}$=1.39, p=0.25).

There was a main effect of time ($F_{[1, 32]}$=15.45, p<0.0001) and item (Greenhouse Geisser $_{[2.4, 75.7]}$, 31.9, p<0.0001) but not of group ($F_{[1,32]}$ =3.68, p=0.064).

In summary there was only one detectable effect of treatment on home management, which explicitly includes the ability to look after children as well as other domestic tasks.

6.6 Exploratory analyses at twelve months

Given that treatment did not have an impact on interactions despite improved functioning in treated mothers, i.e. there was not a significant difference in change scores between the two groups, data on interactions in the two clinical OCD groups were compared with the control group at twelve months.

6.6.1 Mother infant interactions in control and OCD groups at 12m

Interaction variables were compared between groups at twelve months.

Variable	Control group N=37	CBT group N=17	TAU group N=16
Ainsworth sensitivity (1-9)	6.60 (1.51)	5.41 (1.52)	5.25 (1.79)
Ainsworth cooperation-interference (1-9)	6.44 (1.56)	5.59 (1.01)	5.38 (1.30)
Maternal warmth (1-9)	6.58 (1.21)	5.43 (1.45)	5.60 (1.58)
Maternal vocalizations during nappy change (% of total interaction)	92.08 (15.07)	88.18 (23.88)	79.88 (24.89)
Overconscientiousness Dichotomous – n did occur	7	11	9
Dyadic synchrony (1-5)	3.59 (0.80)	3.01 (0.86)	3.02 (0.95)

Table 66: Comparison of interaction variables for CBT, TAU and controls at twelve months.

One-way ANOVAs were significant for comparisons of sensitivity ($F_{[2,69]}$ =5.694, p=0.005), cooperation ($F_{[2,69]}$ =4.221, p=0.019), warmth ($F_{[2,69]}$ =5.379, p=0.007), dyadic synchrony ($F_{[2,69]}$ =3.997, p=0.023) and overconscientiousness (Chi-square=0.001). Post-hoc test revealed that controls differed from both OCD groups, and the OCD groups did not differ in each case (as established earlier).

Vocalizations during nappy change did not differ between groups ($F_{[2,69]}$ =2.16, p=0.123).

All differences had been significant in the two group analysis (control v OCD) at six months with the exception of over-conscientiousness which became significant at

twelve months and maternal vocalizations during nappy changing which became non-significant.

6.6.2 Regression analysis of mother-infant interactions

Both six month and twelve month data indicated differences between mothers with and without OCD in terms of sensitivity and psychopathology. The correlation matrix below indicates relationships between the continuous variables at six months.

	OCI N=71	**ANX N=71**	**DEP N=71**	**SENS N=68**	**FUSS N=71**	
OCI	1					
ANX	0.670**	1				
DEP	0.586**	0.815**	1			
SENS	-0.376**	-0.378**	-0.493**	1		
FUSS	0.269*	0.15	0.194	-0.136	1	

OCI = OCI total score; ANX=DASS anxiety; DEP=DASS depression; SENS = sensitivity; FUSS=fussy/difficult subscale of the ICQ; OCD Dx=Diagnosis of OCD at 6m

Pearson correlations: *p<0.05; **p<0.01

Table 67: Correlation matrix for six month maternal psychopathology and sensitivity

Although there were no group differences in the Bates infant fussy-difficult scale, it was included in investigations of correlation due to previous research suggesting relationships with maternal mood and sensitivity. However, as no relationship

between fussiness and sensitivity emerged in this sample it was not utilised in further analyses.

Given the significant relationships between the remaining variables, and that there were no preexisting hypotheses about specific predictors for maternal sensitivity ratings, a simultaneous regression analysis was conducted entering OCD diagnostic status, six month OCI, depression and anxiety scores, with six month sensitivity score as the dependent variable. The overall model was significant ($F_{[4,69]}$ =5.49, p=0.001) and explained 20.7% of the variance (adjusted R^2).

	B	Std. Error	Beta	t	p
Constant	6.451	0.463		13.938	0.001
6m OCD Diagnosis	-0.047	0.331	-0.027	-0.141	0.888
6m OCI	-0.010	-0.01	-0.177	-0.984	0.329
6m Anxiety	0.02	0.039	0.104	0.508	0.613
6m Depression	-0.060	0.025	-0.446	-2.377	0.02

Table 68: Regression table for six month sensitivity ratings

This analysis indicated that depression was the only significant predictor over and above the other variables at six months.

Given the low change in sensitivity scores over time, a similar analysis was run for twelve month sensitivity data. (Some cases were missing where a mean score was not calculable due to missing video data for one or more tasks).

		6m			12m			6m
		OCI N=71	**ANX N=71**	**DEP N=71**	**OCI N=71**	**ANX N=71**	**DEP N=71**	**SENS N=68**
6m	**OCI**	1						
	ANX	.670**	1					
	DEP	.586**	.815**	1				
12m	**OCI**	.840**	.614**	.529**	1			
	ANX	.470**	.611**	.534**	.608**	1		
	DEP	.409**	.486**	.670**	.590**	.738**	1	
6m	**SENS**	-.376**	-.378**	-.493**	-.400**	-.233	-.297*	1
12m	**SENS N=70**	-.362**	-.384**	-.421**	-.387**	-.303*	-.301*	.782**

OCI = OCI total score; ANX=DASS anxiety; DEP=DASS depression; SENS = sensitivity.

Pearson correlations: *p<0.05; **p<0.01

Table 69: Correlation matrix for maternal psychopathology and sensitivity scores at six and twelve months

In light of the strong effects for sensitivity and for mood reported in table 69, a hierarchical regression analysis was performed to examine the contribution of anxiety, depression and obsessional distress and diagnostic status to sensitivity scores at twelve months for the whole sample. Three variables were entered into the model, DASS anxiety, DASS depression and OCI total scores in two blocks. Twelve month scores were entered as block one and six month scores were entered as block two. Twelve month sensitivity score was the dependent variable.

		B	Std. Error	Beta	t	p
1	Constant	6.502	0.255		25.468	<0.0001
	12m OCD diagnosis	0.197	0.599	0.054	0.329	0.749
	12m OCI	-0.019	0.011	-0.305	-1.704	0.093
	12m Anxiety	-0.028	0.039	-0.126	-0.707	0.482
	12m Depression	-0.005	0.030	-0.030	-1.704	0.866
2	Constant	7.617	0.519		14.666	<0.0001
	12m OCD diagnosis	1.406	0.693	0.388	2.030	0.047
	12m OCI	-0.034	0.017	-0.536	-1.967	0.054
	12m Anxiety	-0.045	0.044	-0.205	-1.039	0.303
	12m Depression	-0.005	0.040	0.178	0.764	0.448
	6m OCD diagnosis	-0.866	0.391	-0.510	-2.213	0.031
	6m OCI	0.020	0.016	0.376	1.287	0.203
	6m Anxiety	0.024	0.048	0.130	0.506	0.614
	6m Depression	-0.046	0.036	-0.346	-1.276	0.207

Table 70: Regression table for twelve month sensitivity and psychopathology

This analysis indicated that only the twelve month OCI score was significant over and above the other variables in the first block. Both regression models were significant indicating an effect of 'maternal distress' on sensitivity (twelve months: $F_{[4,66]}$ =2.753, p=0.035, and six plus twelve months: $F_{[8,66]}$ =2.870, p=0.009). The twelve month variables accounted for 9% of the variance (adjusted R^2), rising to 17.6% (adjusted R^2) with the addition of the six month scores which was significant (R^2 change = 0.127, $F_{[4,62]}$ =2.702, p=0.038).

The finding suggests that having a diagnosis of OCD, even if it is not current is an important predictor of current sensitivity.

6.6.3 Maternal and infant attachment in control and combined OCD groups at 12m

Again given the hypothesised relationship between sensitivity and attachment and the low degree of change in sensitivity scores, attachment was compared in infants of mothers with and without current or historical OCD. The treated and untreated OCD groups had identical distributions of attachment categories and were combined. The proportions of secure and insecure infants in both groups are shown below.

	Control n (%) **N=32**	**OCD n(%)** **N=28**
Avoidant (A)	3 (9.4)	6 (21.4)
Secure (B)	23 (71.8)	20 (71.4)
Anxious/resistant (C)	4 (12.5)	2 (7.1)
Disorganised	2 (6.3)	1 (3.6)

Table 71: SSP categorisations in the OCD and control groups at 12 months

Given the lack of difference between control and OCD groups in the distribution of attachment categories, data was examined according to secure or insecure infant categorization for maternal depression, anxiety, sensitivity and warmth at

six and twelve months as these variables have been linked with insecure attachment.

		Secure N=50	**Insecure N=17**	**t,p**
Depression	**6m**	8.80 (11.91)	11.52 (13.13)	$t_{[65]} = -0.80$, p=0.43
	12m	5.88 (9.24)	8.18 (10.76)	$t_{[67]} = -0.85$, p=0.40
Anxiety	**6m**	6.73 (8.56)	7.06 (7.87)	$t_{[65]} = -0.14$, p=0.89
	12m	4.69 (6.96)	4.47 (6.64)	$t_{[65]} = 0.11$, p=0.91
Sensitivity	**6m**	5.52 (1.84)	4.61 (1.83)	$t_{[65]} = 1.77$, p=0.08
	12m	5.76 (1.69)	5.33 (1.99)	$t_{[67]} = 0.86$, p=0.40
Warmth	**6m**	6.03 (1.42)	5.16 (1.86)	$t_{[65]} = 2.01$, p=0.05*
	12m	5.91 (1.40)	5.58 (1.74)	$t_{[67]} = 0.79$, p=0.43

Table 72: Maternal anxiety, depression, sensitivity and warmth ratings according to infant secure/insecure categorization.

Mothers of insecurely attached children scored less optimally on each of these measures with the exception of twelve month anxiety. The differences between these maternal variables for secure and insecurely attached children appeared to be largest at six months. t tests were conducted to test group differences.

Mothers were asked to rate their own attachment using short descriptive paragraphs (Bartholomew and Horowitz 1991). The proportion of mothers who defined themselves in each category is presented below. The chi-square was significant (p=0.003) indicating a different distribution of categories in each group.

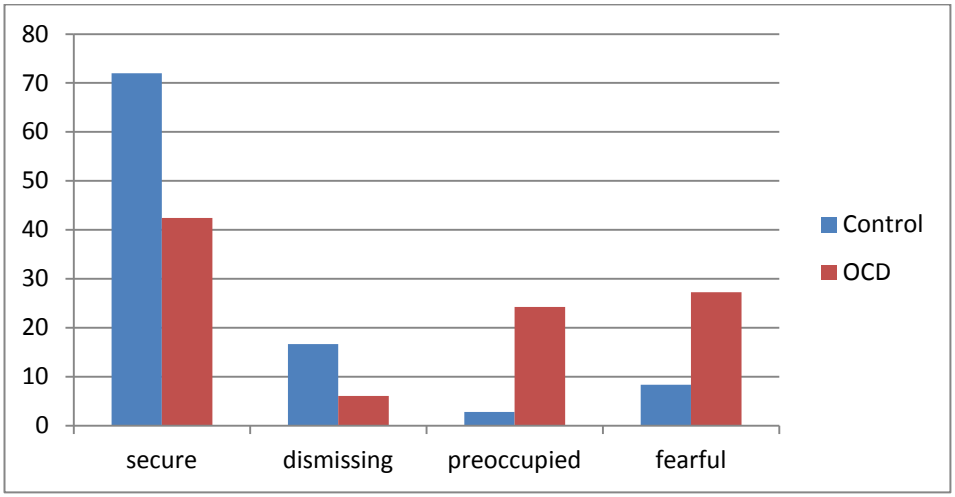


Table 73: Percentage of participants in adult attachment categories in control and OCD groups at 12m

When adult attachment categories were collapsed into secure and insecure the difference between OCD and controls remained significant (Fisher's exact=0.016).

Given these differences, the concordance between secure and insecure attachment in the two groups was examined using Kappa. Within the control group, the concordance between attachment categories was measured at Kappa =0.012 (p=0.947). In the OCD group the Kappa was 0.099 (p=0.549) suggesting a low level of concordance in both groups.

6.7 Summary of results relating to specific hypotheses

1. Mothers scoring highly on the antenatal OC measures will develop more symptomatology postnatally than the comparison group of low scorers.

OCI scores in both groups reduced significantly from ante- to postnatally, with the group difference halving from 30 points to 11/12 over time. More mothers in the high-risk group developed a diagnosis of OCD at six months but no mothers had this diagnosis at twelve months.

2. Mothers with symptoms of OCD will exhibit less sensitive interactions (as defined by Ainsworth, see above) at 6 months with their children than those without anxiety.

Mothers with OCD were less sensitive than mothers without OCD (effect size d=0.839).

3. Mothers receiving immediate treatment will exhibit improvements in psychopathology greater than waiting list controls by 12 month assessment.

Mothers receiving immediate CBT showed significantly lower scores than comparison mothers in the treatment as usual group on measures of OCD at twelve months. However, they did not improve more on measures of general anxiety and depression, with both groups showing some improvement.

4.Mothers with untreated OCD symptoms will have a greater proportion of insecurely attached children as assessed by the Strange Situation Procedure (SSP) than those without.

Mothers with treated and untreated OCD did not differ in proportions of securely and insecurely attached children. Furthermore, the OCD groups were combined

and did not differ from the control group where the mother had not experienced OCD.

5. At 12 months, dyads where mothers are successfully treated will show higher levels of maternal self-efficacy than those where mothers are not treated.

Self-efficacy was not changed significantly by treatment and no group differences were detected.

7. Discussion

7.1 Main findings

The study used a short antenatal screening instrument to examine risk of developing OCD in a general community sample. More cases of OCD developed in the high risk group (based on high screening scores on obsessive-compulsive symptoms and/or a measure of responsibility) than a low risk group at six months postnatal (3/12 v 0/33 cases). One case was clinically symptomatic antenatally, one case had a history of OCD and one was a new onset postnatal case. However, for all three women the psychopathology subsided in terms of caseness by twelve months.

Obsessive-compulsive symptomatology was examined in mothers with OCD and controls. Mothers with OCD were by definition more distressed by obsessive-compulsive symptoms, but control mothers reported experiencing the same range of obsessions and compulsions. However, greater numbers of mothers with OCD were troubled by intrusive thoughts of deliberate harm, sexual thoughts, contamination and magical thinking. Regarding responses to intrusive thoughts, a similar pattern was found. The same range of strategies to respond to thoughts was endorsed by mothers in each group. Mothers with OCD engaged in more self-reassurance, avoidance, distraction and ritualizing.

This is the first study to delineate parenting variables in mothers with OCD and compare them with control mothers in the early postnatal period. Differences from

the non- clinical comparison group were found in terms of general parenting self-efficacy and enjoyment of everyday parenting tasks (feeding, nappy changing and play). Mothers with OCD were rated as less sensitive in observed interactions across these situations and they also differed in terms of observed warmth and vocalisations to the baby.

This was also the first controlled study of treatment for postnatal OCD. Intensive CBT for OCD was compared with treatment as usual (TAU) in a randomized trial. As expected, treatment improved obsessional symptoms more rapidly in the CBT group, with evidence of some improvement of symptoms in the TAU group. There was a significant effect of treatment on obsessive compulsive symptoms but not on depression and general anxiety. However, there was no evidence that treatment alleviated interactional difficulties. Ratings of sensitivity did not differ between CBT and TAU groups at twelve months despite significant differences in maternal symptomatology. Current symptomatology including depression and general anxiety explained some of the variance in sensitive responding.

Finally, mother-infant attachment appeared to be unaffected by the presence of current or past maternal OCD.

7.2 Discussion of findings in the context of existing literature

7.2.1 Responsibility appraisals and risk of developing postnatal OCD

Childbirth is thought to trigger OCD by an objective increase in responsibility that interacts with pre-existing beliefs regarding responsibility (amongst other variables)

(Fairbrother and Abramowitz 2007). Despite the centrality to cognitive conceptualizations of perinatal OCD, little is known about change and stability in levels of responsibility appraisals during and after pregnancy and what the implications might be for the increased risk of developing symptoms. This study provided some new findings relating to the longitudinal understanding of responsibility appraisals in the perinatal period. Overall, mean responsibility as assessed by full questionnaire fell slightly from antenatal levels in both high and low risk groups. However, the mean score for those in the high risk group was higher at twelve months than six months and scores in the high risk group remained significantly above the low risk group at all timepoints. This suggests that responsibility may be an important and enduring risk factor for psychopathology.

The brief screening questionnaire indicated little change on RAS items from ante- to postnatally. However, some of those with a low screening RAS at 3-5 months antenatal had high RAS scores at 7 months antenatal. A better understanding of 'normative' levels of responsibility belief in this population at varying timepoints might help refine the cognitive conceptualization of risk and resilience.

Previous work has shown that certain cognitive factors as measured antenatally such as beliefs about the importance of thoughts confer vulnerability to postnatal obsessive-compulsive symptoms (Abramowitz, Nelson et al. 2007). Given the limitations of numbers, the current study provides cautious support that vulnerability to postnatal obsessive compulsive disorder can be detected antenatally using a brief screening measure including both symptom and responsibility belief elements.

Despite a small number of participants, three cases of OCD were present at six months in the high risk group compared with none in the low risk group. In terms of the course of OCD, one women with postnatal OCD at six months had a history of OCD, indicating that the postnatal period had re-triggered her symptoms, which is a common phenomenon in the literature e.g. (Uguz, Gezginc et al. 2007). Another woman had OCD at the antenatal assessment and the third woman had no history of OCD. However, one woman with a history of OCD in the high risk group did not develop ante or postnatal OCD.

In all three cases who had OCD at six months postnatally, the OCD had remitted spontaneously to at least sub-clinical levels by the time mothers were assessed at twelve months. (Miller, Chu et al. 2013) found that above threshold scores at ante and postnatal timepoints were stable in 45% of mothers indicating significant change in both directions in the postnatal period .By contrast, untreated mothers with OCD in the clinical part of the study appeared to have more persistent OCD that did not remit and remained at clinical levels of severity, which is consistent with the one study examining the course of postnatal onset OCD (Uguz, Kaya et al. 2008).

7.2.2 Characterising mothers with postnatal OCD at six months

In terms of contributing to the literature characterizing the population of mothers with OCD, the current study was consistent with previous research indicating that fears of deliberate harm and contamination fears comprise the majority of postnatal presentations of the disorder (Abramowitz, Schwartz et al. 2003), 41%

and 29% in this study respectively. However, a variety of presentations were noted. The infant was usually but not universally the focus of obsessional concerns. No previous study has compared postnatal obsessive-compulsive symptoms in concurrent samples of mothers with and without OCD. As mentioned above the current study found the same range of symptoms was experienced in both groups, with more OCD mothers experiencing fears of deliberate harm and contamination, and endorsing a range of thought neutralization and control strategies. This is further evidence in support of the cognitive conceptualization of OCD and the notion that intrusive thoughts differ in meaning and responses between clinical and non clinical groups rather than their occurrence per se (Salkovskis 1985).

Mothers in the clinical OCD group had a greater frequency of family history of OCD and depression than mothers without OCD, which is consistent with previous studies in both OCD and perinatal OCD (Uguz, Akman et al. 2007), although not those taking a strict definition of established diagnosis (which the current study did not) (Forray, Focseneanu et al. 2010).

In terms of their own history and current state of mind regarding attachment, mothers with OCD reported higher rates of 'fearful' attachment style compared with controls. According to a dimensional measure of attachment, mothers scored more highly on vulnerability within their current attachment relationships, consistent with previous findings of insecure attachment styles in people with OCD (Doron, Moulding et al. 2012).

Mothers with OCD in this study had a slightly higher frequency of miscarriage, consistent with (Geller, Klier et al. 2001) and lower rates of termination unlike

(Uguz, Akman et al. 2007). Lower rates of termination might fit with the presenting psychopathology of OCD including fear of causing or allowing harm to others (harm avoidance), although this is purely speculative.

Breastfeeding has been implicated as playing a protective role in postnatal anxiety (Buttolph and Holland 1990; Ross and McLean 2006) and has been associated with maternal sensitivity (Tharner, Luijk et al. 2012). Rates of breastfeeding differed significantly between mothers with and without OCD in this study. Several of the mothers in this study did not or could not breastfeed, many of them because of medication they were advised to take. It is possible that this interfered with the protective effects of breastfeeding either hormonally or by the effect on psychological variables such as self-efficacy in the mothering role.

Previous literature has described interference in parenting behaviour from OCD, mainly using anecdotal evidence from case studies. However, the details of this have not been well characterized. Results from the current study add to the literature in providing evidence that OCD affects several aspects of the postnatal parenting context in terms of lower self efficacy, social support and marital satisfaction. However, no differences were found in mothers rating of infant temperament. Mothers rated substantial impairment in various domains of parenting, most notably in the 'ability to have fun and enjoy being with the infant'. These two findings indirectly suggest that they perceived this difficulty as a function of their OCD rather than of the infant's characteristics.

Marital relationships were of worse quality for mothers with OCD. The current study did not assess partner views of the maternal disorder or levels of accommodation such as delegation of tasks to partners.

Mothers with OCD were more frequently rated as high in expressed emotion towards the infant, almost all in the emotional overinvolvement category, although this difference was not apparent at twelve months. However, the low kappa reflecting modest agreement for this rating at six months (but not twelve) necessitates cautious interpretation of this result.

7.2.3 Mother-infant interactions

Moving from maternal perceptions to observed interactions, this study is the first to attempt to systematically characterise parenting interactions of mothers with OCD using established scales. Mothers with OCD were found to be less sensitive than controls across everyday parenting situations, consistent with previous research in parenting by anxious mothers (Nicol-Harper, Harvey et al. 2007). The group mean score for mothers with OCD fell closest to the 'inconsistently sensitive' categorical rating. Secondary analysis indicated that maternal depression was the single significant psychological predictor of sensitivity at six months, although the combined effect of maternal distress was also significant. This finding is consistent with the fact that mothers with OCD exhibited some flat mood in interactions at six months, and more than control mothers. Intriguingly, at twelve months the concurrent OCI score was the only significant predictor in the model (with maternal distress remaining significant). Furthermore, a greater proportion of mothers with

OCD than without were exhibiting behaviours that were categorized as over-conscientious at twelve months, a difference that had not been apparent at six months. Such behaviours may be more normative with small babies and it might be the case that differences were becoming apparent in the context of the challenges that a mobile one year old presents.

Researchers who have used disorder specific challenges or priming to elicit specific symptoms of maternal psychopathology have found altered interactions and increased levels of interference in those situations highlighting the potentially interfering role of maternal cognitions in mother-infant interactions (Murray, Cooper et al. 2007; Stein, Craske et al. 2012). Given the lack of previous research relating specifically to OCD and the heterogeneity of the OCD diagnosis, no specific challenges were designed in this study. However, the pervasive nature of OCD often means that triggers for intrusive thoughts become generalized. Therefore for several mothers, playing with the researcher's toys or nappy changing may have elicited intrusive thoughts. Tangential support for this lies in the finding that mothers with OCD reported less enjoyment of each of the tasks assessed in this study. In addition, lower levels of vocalizing were found in mothers with OCD during the nappy change which may have indicated a degree of 'online' preoccupation, similar to reduced vocalizations following priming in mothers with GAD in the study by (Stein, Craske et al. 2012). For some, the presence of the researcher attenuated the feelings of risk and danger they would otherwise have felt in that situation. However, for mothers for example with contamination fears the presence of the researcher and seeing the baby playing with unfamiliar toys was

a source of additional stress. Small numbers meant that it was not possible analyse tasks according to symptom type, but general differences in parenting interactions were still detectable.

7.2.4 Intensive CBT for postnatal OCD

Intensive CBT was effective for this group as hypothesized and this is consistent with previous work (Challacombe and Salkovskis 2011). Prior to entering the study, mothers in this sample had experienced a range of interventions including various medication and CBT. In general these had not been perceived as helpful and mothers remained symptomatic. It is difficult to assess how representative these experiences are but the literature on help-seeking in OCD and in the perinatal period suggests that mixed experiences of diagnosis and treatment are commonplace. By contrast intensive CBT improved obsessive-compulsive symptoms for most mothers who completed it and the improvements were generally maintained 5 months later. Intensive CBT appeared to be effective for all presentations of CBT (although detailed analysis was not possible for reasons of numbers). Unexpectedly, although no specific hypotheses had been formulated, CBT was more limited in the effect on depression and general anxiety, which improved at a similar rate in both groups. However, the adjusted effect size for obsessive symptoms according to the OCI was d=1.90, which exceeded the adjusted effect size for the OCI of 1.24 reported by (Challacombe and Salkovskis 2011) and of 1.39 at post-treatment in a meta-analysis of CBT for general OCD (Olatunji, Davis et al. 2013).

CBT was most effective for obsessions, consistent with the general treatment literature (Abramowitz, Franklin et al. 2003).

In previous treatment trials, percentage change on the primary outcome measure has been utilized as the main outcome (e.g. Tolin, Abramowitz et al. 2005), and this was the rationale for its use in the current study. However, the approach of using the mean change of the combined sample may mask important effects, particularly if there are a small proportion of non-responders. Perhaps more useful and descriptive indicators of change are indices of reliable and clinical change. This approach takes into account that the magnitude of change exceeds the measurement error inherent in the measure. Measures of clinical change examine whether the person has changed from a particular category of 'caseness' to another category, or non 'caseness'. This can be estimated using change in excess of 2 standard deviations from the clinical or pre treatment mean of the clinical group (or to within 2 sds of a normal group).

For example, using categorical change on the YBOCS, it could be said that 70% of the treated cases were recovered or categorized as having mild illness compared with 18.75% of the TAU group.

This is the first controlled trial of intervention for postnatal OCD (or any postnatal anxiety disorder) and shows that a psychological treatment can be rapidly effective. Given the interference in breastfeeding from taking prescribed medication reported in this study, intervention of this nature may present a preferable alternative. A further benefit of intensive over other formats of CBT delivery is that it may suit the childcare requirements of mothers with small babies.

7.2.5 Changes in maternal psychopathology and in parenting interactions

No previous research has examined the effect of changes in obsessive-compulsive symptomatology on early parenting interactions. A single non-clinical study found that changes in trait anxiety and ratings of infant difficultness as well as greater father involvement led to more sensitive interactions (Feldman, Greenbaum et al. 1997). However, evidence from clinical studies of depression indicates that changes in mood do not significantly alter dysfunctional interactions (Murray, Cooper et al. 2003; Milgrom, Ericksen et al. 2006; Forman, O'Hara et al. 2007). The current study appears to be consistent with that research. Taking the combined groups as a whole, self rated depression stood out as the only significant stand alone predictor of sensitivity at six months, but the combined predictors related to maternal distress predicted more variance. Therefore, given that depression changed to a lesser degree than obsessive compulsive symptoms in mothers who received treatment, this may still have been interfering with interactions at twelve months. Depression is known to influence mother-infant interactions (Zekoski, O'Hara et al. 1987) although there is far less of an evidence base to judge the impact of anxiety.

In the regression model for sensitivity measured at 12 months, the beta for having a diagnosis of OCD at 12m increased from block 1 to block 2, moving from 0.054 to 0.388. Thus the addition of the block of four 6m variables appeared to increase the impact of concurrent diagnosis on sensitivity. One explanation of this finding is that it was a result of suppressor effects, related to the inter-correlation of the predictor variables and the relatively small n of the sample. The beta for all 12m variables

increased with the addition of the six-month data, and the explained variance increased significantly with the addition of this block. Further analysis using backward elimination as step 2 would be one method to help clarify which variables added most to the model.

Alternatively, this finding could be interpreted as 12 month OCD diagnosis acting as a proxy for longevity and overall severity of composite maternal distress (including anxiety, depression and obsessive symptoms), becoming increasingly important as a predictor of sensitivity with the addition of the 6m variables.

The CBT provided in this study did not explicitly address parenting interactions or self-efficacy as a parent although changes were hypothesized given the significant interference in parenting reported by symptomatic mothers and that treatment goals often centred around reducing the impact of the problem on caregiving. Pilot work indicated that this intervention had been helpful for parenting according to mothers own report (Challacombe and Salkovskis 2011). It might have been the case that although OCD interferes with parenting behaviour, it does not interfere with the underlying feelings of attachment to the baby from the mother's perspective. However, maternal perceptions of self-efficacy remained compromised after treatment and mothers continued to report some, if reduced interference in parenting. Treatment studies in OCD indicate that for some people with OCD, quality of life can remain impaired even after considerable improvement in symptoms (Diefenbach, Abramowitz et al. 2007).

7.2.6 Mother-infant attachment in mothers with OCD

It follows therefore that although sensitivity can be affected in mothers with OCD, this may be as a result of depressive psychopathology or due to a composite factor of maternal distress. The presence of a current or past diagnosis of OCD did not impact on mother-infant attachment measured at twelve months and this was a clear finding from this research. Rates of secure mother-infant attachment for women with treated or untreated OCD did not differ from controls. Previous research has found that sensitivity only explains some of the variance in predicting attachment categories (De Wolff and van Ijzendoorn 1997). Therefore, although maternal sensitivity was compromised, either it may not be the primary mechanism for developing secure attachment, or it may not have been compromised enough to make a difference. Alternatively, or in addition, there may be buffering effect from other aspects of the mother-infant relationship. If OCD is a problem (for many, if not all sufferers) of inflated responsibility and over-care, it is consistent with this that whilst aspects of the symptoms may interfere with the ability to be sensitive, the underlying affective bond remains intact. There are likely to be enough ways for the mother to convey this to the child, or this may be easier to convey at times she is less stressed and preoccupied by the demands of the disorder. In contrast with other disorders such as panic where the primary threat is to self, the focus on preventing harm to others that is so prominent may mean that traits or other factors related to maternal OCD may in some way be protective against insecure attachment.

In short, most mothers with OCD seem able to compartmentalize the demands of parenting and the demands of OCD. This may explain the contrast with the study of (Manassis, Bradley et al. 1994) who found that 80% of infants in their sample mostly comprising mothers with panic were insecurely attached, and 65% were disorganised.

7.3 Limitations

A number of issues with each study mean that caution should be exercised in interpreting findings.

7.3.1 Screening study

A large number of antenatal screening questionnaires were completed. However, low response rates for the postnatal questionnaire in particular precluded detailed analysis of longitudinal data. The screening questionnaire was limited to OCI and RAS items. Another factor that has been shown to be important in predicting symptoms is the importance and need to control thoughts (Abramowitz, Nelson et al. 2007). The inclusion of a measure such as the RIQ could have provided insight into this belief domain. The moderate but significant correlations between mother and partner scores raise the issue of whether observations were truly independent as questionnaires were generally completed simultaneously in the antenatal clinic.

There was a relatively low response rate (although consistent with similar questionnaire studies) for the postnatal questionnaire. Non-responders may have been higher in symptomatology (based on antenatal questionnaire scores).

7.3.2 Follow up study

The follow up study was designed to examine changes in OCD symptomatology in a large group of high risk mothers and a group of low risk mothers (below 50th centile). The planned design and numbers would have allowed for greater examination of the influence of risk as defined by a cognitive measure and a symptom measure and for greater confidence in the conclusion that the screening instrument detected risk adequately. However, the two recruited groups differed at screening on these measures and the hypothesized results of a greater incidence of postnatal OCD were found although any subgroup analysis in the high risk group was not possible.

A high threshold was set for identifying participants for the follow up study (95 centile). It might have been better to include those above 90% centile to capture a more broadly defined range of risk but much larger numbers would have been required to then detect differences.

As the screening questionnaire consisted of two measures, a small number of mothers in the low risk group were very low on one scale with much higher scores on the other. That is to say, they did not score over 23 on the OCI or 33 on the RAS but scores were approaching this on one subscale. These mothers were not as clearly 'low risk' on both measures as the majority, and this may have reduced the

clarity of the findings as they might feasibly have been included in the high risk group if the threshold had been slightly lower.

The screening questionnaire was administered between approximately 3 and 5 months antenatal. Scrutiny of the full questionnaires administered at the 7 months antenatal assessment indicated that the 'low risk' participants who developed postnatal pathology had higher than expected RAS scores at this point. That is, the screening instrument – including questions drawn from the RAS - did not identify these participants as high risk despite high scores on the full RAS at the antenatal assessment. This discrepancy could be due to limitations in the psychometric properties of the screening questionnaire or due to significant changes in RAS scores between screening at 3-5 months antenatal and assessment at 7 months. The screener was not validated against the RAS or other measure of responsibility. whether a greater number of distressing symptoms or a more inflated sense of responsibility conferred greater risk for the development of OCD and other difficulties but numbers precluded this analysis.

Recruitment into the follow up study was at a lower rate than predicted at only 22.7% of those invited, although this rate did not differ between the two groups. As mentioned, this compares with community studies in perinatal mental health that have recruited antenatally and requiring face to face contact which showed participation rates of 41-95% (Andersson, Sundström-Poromaa et al. 2003; Sutter-Dallay, Giaconne-Marcesche et al. 2004; Adewuya, Ola et al. 2006; Kitamura, Yoshida et al. 2006) . The numbers of participants in the follow-up study were much lower than had been predicted and some data was missing in the high risk group,

further reducing the power available for planned comparisons. 43/49 (88%) participants were retained in the study. This compares favourably with retention rates of 47-77% over the first postnatal year reported in other longitudinal studies (Abramowitz, Nelson et al. 2007; Chaudron and Nirodi 2010; Mauri, Oppo et al. 2010)**.** The perinatal period is a challenging time for recruitment and retention in longitudinal studies due to the mobility of the population and high level of practical and emotional demands that most women are facing at this time. The inner city population with high rates of social disadvantage and high rates of mobility proved particularly difficult to recruit into the study.

As mentioned, community studies in perinatal mental health that have recruited antenatally and requiring face to face contact showed participation rates of 41-95% (Andersson, Sundström-Poromaa et al. 2003; Sutter-Dallay, Giaconne-Marcesche et al. 2004; Adewuya, Ola et al. 2006; Kitamura, Yoshida et al. 2006) . The current study used a two stage procedure to recruit mothers into the detailed follow up study. As mentioned 68.4% of mothers completed an initial screening questionnaire; however, only 22.7% of those with whom contact was attempted were successfully recruited into the follow up study, which did not differ between high and low risk groups. This suggests that other factors played a role in recruitment and retention.

The assessment points for both community and clinical cohorts were spread out over the antenatal and postnatal period and might not have captured important fluctuations in symptomatology. In particular, the first postnatal months may have been a particularly interesting time to examine the possible emergence of

obsessive-compulsive symptoms as mothers adapted to the responsibility of the role and new tasks such as breast or bottle feeding (Leckman, Mayes et al. 1999). However, the resources of the study were limited and recruitment might have been further reduced with increased demands on participants.

The high risk group exhibited more cumulative pathology, including greater numbers of past and current diagnoses and subthreshhold pathology in the postnatal period. These mothers were also younger and less well educated than controls. Current and past diagnoses were present in 50% of the high risk compared with 24% of low risk participants. The screener may have been picking up on general pathology rather than OCD in particular, although the mood questionnaires were not concurrent with the screener so this could not be tested. However, the finding was clear in that no cases of OCD developed in the low risk group despite the development of other psychopathology from ante to postnatal.

Although novice raters (psychology graduates) were used to conduct the assessments they were trained and regularly supervised. However, diagnoses in both groups might have been either under or over recognised. However, a considerable strength of the study was that all assessors were blind to group membership.

7.3.3 Comparison of OCD and control participants

The OCD participants were recruited from samples of convenience and were defined as a treatment-seeking sample. They made contact to participate in the research as they may not have had treatment locally, or they were unsatisfied with

local treatment, and so may have been 'more severe' than the underlying population of mothers with OCD. However, they resembled treatment-seeking populations of people with OCD in general with mean YBOCS scores in the 'severe' range. They had lower levels of comorbid anxiety and depression than is found in general OCD samples, although there is not good evidence yet concerning comorbidity in postnatal OCD samples.

The clinical group had persistent OCD at 6m and so may have differed from mothers with OCD in general (for example (Uguz, Gezginc et al. 2007) found that some mothers with pre-existing OCD improve in the early postnatal months). However, there is also evidence that untreated postnatal-onset OCD tends to persist over the first year (Uguz, Kaya et al. 2008). Relatively small numbers in the study precluded analysis by time of onset.

On the other hand, mothers in the study were a self-selected sample who consented to scrutiny of parenting and interactions as part of the study and so may have differed from the population of mothers with postnatal OCD in terms of their perceptions of the impact on parenting. Nonetheless, questionnaire measures indicated significant self-reported interference with parenting for most mothers with OCD at six months.

The control participants comprised the low risk mothers from the longitudinal sample and as such were not a 'healthy' control group (i.e with no current or past diagnoses). At six months, all diagnoses were historical with the exception of one mother with GAD. This may have reduced the effect size of the findings. Despite being formally unmatched, the control group was similar to the OCD group on most

important demographic variables known to impact on maternal interactions such as maternal age, education and ethnic background, although the difference in education approached significance.

One limitation of the study and method of analysis was the use of multiple t tests and ANOVAs, and the consequent increased likelihood of Type 1 error. Use of a Bonferonni corrected p value would have helped reduce the probability of such errors. Most of the results would have remained significant.

Given the design of the clinical study was (i) a cross sectional comparison and then (ii) an outcome study, this correction could have been applied to each part of the study separately, in order to reduce the family-wise error rate, but balancing this against the risk of making a Type 2 error.

Another approach would have been to use a correction for the multiple tests used to examine each hypothesis, for example, use of the YBOCS (clinician rated) and OCI (self-report) to measure OCD outcomes of the clinical trial. In this case, the *collective* alpha required to reject the null hypothesis would not exceed 0.05.

7.3.4 Clinical trial

The lower than anticipated numbers of participants was also a limitation in the clinical trial which may have been underpowered to detect hypothesized differences. However, differences were detected with the exception of attachment and the distribution of attachment categories was identical between groups

suggesting that inadequate power was not an issue. As with most research in OCD, the clinical groups were relatively heterogenous and this may have masked differences in the key variables. Further noise was introduced by the comparison of intensive CBT with treatment as usual as TAU included some CBT. Participants in both groups were also taking medication between 6-12 months postnatally, but at similar rates. It would have been unethical to prevent mothers from accessing treatment whilst on the waiting list and it was beyond the scope of the current study to provide an active control treatment.

The primary therapist was herself visibly pregnant for a proportion of the study treatments. Having returned from maternity leave, she was also managing the demands of looking after a young child. She was thus a 'peer' of the client group for a part of the duration of the study. Whilst matching therapist and client characteristics are not a prerequisite for the delivery of good CBT, it is likely that this fact increased client empathy and may have contributed to additional therapeutic power, for example in modeling during exposure based elements of the therapy. However, this can only be speculation; the published case series which preceded the RCT was not conducted under these circumstances, and very good results were obtained in terms of client outcome (adjusted effect size = 1.24).

The study participants were block-randomised to CBT/TAU. OCD diagnosis was established prior to randomization but no other differences were taken into account at this stage. Unfortunately there was a difference in baseline anxiety between the groups. One potential strategy which may have prevented such an important group difference would have been to stratify the randomization for

general anxiety levels. This can help deal with potential differences in prognostic factors that arise by chance. Use of stratification would have required anxiety to be adjusted for in the planned analysis due to the consequent effect on p values and the increased risk of making a Type 1 error. Stratification may be difficult to implement in small trials, particularly if there are several variables of interest that may differ at baseline. Minimisation is another commonly used alternative to randomisation with small samples.

7.4 Clinical implications

The study contributes to a growing body of literature that OCD can be a problem in the postnatal year and it can have a significant impact on maternal functioning and parenting. It is not yet clear that postnatal OCD is a specific subtype but there are challenges specific to the perinatal context for mothers and health professionals.

The study provides preliminary evidence that a brief antenatal screening instrument could be developed to detect OCD in community sample. Screening approaches that aim to identify a range of perinatal disorders should not just be asking about levels of anxiety in general – specific measures are needed to drill down into the type and content of anxiety for accurate screening and diagnosis. As mentioned, two of the three women who did develop OCD in the high risk group had a history of OCD and establishing this is likely to help identify those at risk. However, many women may not have identified themselves as having OCD or been diagnosed as suffering from an obsessional problem and so would not be able to disclose this. Therefore asking women if they have a history of OCD by enquiring about specific

symptoms and experiences rather than restricting enquiries to prior diagnoses may be a brief and efficient way of identifying women at risk. For this type of screening, some knowledge of OCD and skill on the part of the interviewer would be required.

For those with clinical levels of symptoms, sensitive recognition and diagnosis of OCD at the point a person makes contact with services could help facilitate access to treatment and a quick recovery. There is manifold evidence that CBT works for OCD with growing evidence that intensive treatment can be effective in the perinatal period and this is an important message to convey to service users.

Understanding the discrepancy between symptoms expressing worry about harm and actual risk of harm is crucial. Inappropriate assessment of high risk can exacerbate and prolong symptoms by reinforcing fears and acting as 'institutional safety behaviours' (Challacombe and Wroe 2013). This study provides evidence and can support appropriate clinical reassurance that having a diagnosis of OCD does not mean the infant is at greater risk of harm or of insecurity. Future work should help disseminate this message to primary care health workers.

Clearly the best model would be to prevent new cases of disorders (Cuijpers, Van Straten et al. 2005). Previous research has shown that a cognitive intervention for those at risk of perinatal OCD may be effective in reducing the development of symptoms postnatally (Timpano, Abramowitz et al. 2011). However, the time and expertise required to identify a 'high risk' group in pregnancy based on current knowledge of risk factors may be prohibitive. However, it is possible that wider dissemination of general information about the normality of intrusive thoughts of

all descriptions in the perinatal period may help to allay fears and prevent the escalation of anxiety in some mothers.

In conclusion: these studies show the need for improved identification of those women who are vulnerable to developing OCD, and that a brief intervention can be highly effective. Targeted at the right population at an optimal time, cognitive behaviour therapy for OCD may alleviate distress, improve the experience of parenting and benefit the mother and infant.

7.5 Implications for future research

This study reports preliminary results into the possibility of screening for OCD. Future research should investigate fluctuations in OCD symptoms during pregnancy and in the first postnatal months. Such studies could inform researchers and clinicians on what the best time to administer such a screening instrument to pick up interfering and lasting symptoms postnatally. Larger studies are required to evaluate and refine predictors of those who develop more persistent OCD, such as those in whom acute symptoms are triggered by the pregnancy. A better longitudinal understanding of the symptoms of OCD and other specific anxiety disorders in pregnancy, postnatally and beyond could help elucidate whether some disorders are more associated with the 'programming hypothesis' suggested as the link between anxiety in pregnancy with poorer child outcomes (O'Connor, Heron et al. 2003). Such knowledge could help target efforts at prevention.

The results of the current study indicate that sensitivity is compromised compared to mothers without OCD and this may be particularly so in situations that mothers report as more subjectively challenging. OCD is a particularly heterogenous disorder and the specific symptoms associated with particular subtypes are likely to interfere with parenting in different ways. Future research should concentrate investigations on characterizing parenting difficulties at this level. A better understanding of the mechanisms and longer term implications of interference for particular subtypes is required.

OCD is known to affect family members greatly, and marital relationships of women with OCD appeared to be less satisfactory than controls. It was beyond the scope of the current study to investigate family accommodation or the perspective of the partner but this would be important in terms of child development. Partner involvement has been shown to be beneficial in treatment for OCD and this may be the case for mothers with young children.

Not all mothers improved to subclinical levels, or maintained improvement at follow up with intensive CBT. Further refinement of the treatment offered in terms of improving effectiveness and maintenance of gains is required. Studies with longer term follow up datapoints after treatment are required to examine relapse and resilience to relapse after CBT. A particularly important line of enquiry would be to investigate whether CBT prevents exacerbation or relapse in subsequent pregnancies.

It will be important to investigate what happens to children of mothers with OCD in the longer term. Cross-sectional evidence suggests that observable differences in

interactions are detectable in the mothers with OCD and their older children. The children themselves may be showing subtle (rather than frank) signs of difficulties or reduced strengths by the time of primary school (Challacombe and Salkovskis 2009).

Research with older children emphasizes the contributions of child anxiety to maternal interactions (Moore, Whaley et al. 2004), and the predictive value not only of maternal experienced but displayed anxiety (Creswell, Willetts et al. 2008). This may become relevant for mothers with OCD at a point beyond infancy when the child is a more autonomous agent. The finding that obsessive compulsive symptomatology is beginning to have more of an impact at twelve months supports this suggestion.

Long-term studies are required to fill the gap in understanding between the epidemiological literature which suggests clustering of anxiety including OCD within families, and the observational literature in which such differences are less apparent. Detailed research could help inform views of both risk and resilience to the development of OCD.

There is no integrated understanding of the impact of EE, sensitivity and attachment on the development of obsessional psychopathology including related beliefs.

Given the levels of parenting interference described by mothers, it would be useful to develop and test a clinical intervention to help alleviate parenting and interactional difficulties. This might be the addition of 'parenting modules' that

could be added to conventional CBT in order to enhance its effects on interactions or established interventions such as video-feedback. The timing of such an intervention would be important given the rapidly changing demands on parenting due to the developing infant.

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APPENDICES

Appendix 1: Example patient information sheets and consent forms (screening study and clinical study)

Institute of Psychiatry
at The Maudsley

Department of Psychology
Institute of Psychiatry
De Crespigny Park
London, SE5 8AF

KING'S College LONDON
University of London

JULY 2010/Version 4

ANXIETY & RELATED THOUGHTS AND BEHAVIOURS DURING PREGNANCY & THE POSTNATAL PERIOD: I

INFORMATION SHEET & CONSENT FORM

You are being invited to take part in a research study investigating the development of problematic anxiety in expectant parents. We are examining the extent to which parents experience certain thoughts and behaviours which may be relevant to these problems. Before you decide whether to take part please take time to read the following information carefully. Please ask if there is anything that is not clear or if you would like more information.

Thank you for reading this and for your interest in the research.

1. What is the purpose of the study?
Anxiety problems can be very debilitating, and there is some evidence that life events like having a child can trigger or worsen these problems. We are looking at particular thoughts and behaviours relevant to anxiety that people might experience during pregnancy or after they or their partner has a child. We would like to establish how common these are and whether they are related to the development of anxiety problems at this time. We hope that this will help us develop effective ways to identify, treat and prevent these problems at an early stage.

2. Why have I been invited?
We are asking a large group of mothers and fathers who are currently expecting a child to participate.

3. Do I have to take part?
Participation in the study is entirely voluntary and you can refuse to participate or withdraw at any time and without giving a reason.

4. What do I have to do if I agree to take part?

i. If you agree to take part, you will be asked to complete a short questionnaire. This should take five to ten minutes and can be posted back.

ii. We would like to post you a further, similar (short) questionnaire about 4 months after your baby has been born. This will happen automatically but, if you would like us to, prior to doing this we can contact your GP to find out the birth outcome and would not contact you again in the event of serious complications.

1

iii. Based on the answers to the short questionnaire, we would like to invite a very small number of people to take part in a more detailed study of the same issues. If you are selected, the researcher will contact you by phone, will then explain the study and provide full written details and a separate consent form.

5. Will my taking part in this study be kept confidential?
All information that you give as part of the research will be kept strictly confidential and will only be accessed by the researchers. All materials and data will be given an anonymous code that is used in data analysis. Nothing is reported that might identify individuals.

6. What will happen to the results of the research study?
The results will eventually be published in academic journals and presentations. Self-help and service user sites will also publish summaries of the main findings. No personal information will be identified in any publication of the results.

7. Who has reviewed the study?
This research has been reviewed and approved by the Lewisham Research Ethics Committee (Ethics approval reference: 08/H0810/18).

8. Where can I get more information?
If you have any further questions please feel free to contact one of us at any time using the details below.

Many thanks for your interest in this research.

Dr Fiona Challacombe
Chartered Clinical Psychologist

Tel: 0207 848 0762
fiona.challacombe@iop.kcl.ac.uk

Prof Paul Salkovskis
Clinic Director, Centre for Anxiety Disorders and Trauma
0207 848 5038
paul.salkovskis@iop.kcl.ac.uk

Address for further information:
Department of Psychology, POBox 77
Institute of Psychiatry
King's College London
De Crespigny Park
London SE5 8AF.

Institute of Psychiatry

at The Maudsley

CONSENT FORM

Study Title: Anxiety & related thoughts and behaviours during pregnancy & the postnatal period

Researchers: Fiona Challacombe & Paul Salkovskis

Participant number: K

Version 4: July 2010

Please initial box

1. I confirm that I have read and understand the information sheet dated July 2010 (version 4) for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐

3. I understand that the information I provide will be collected fairly, will remain secure and confidential, and held no longer than necessary for the purposes of this research. ☐

4. A: I am happy to be sent the postnatal questionnaire 4 months after I am due to give birth ☐

OR

B: I would like my GP to be contacted about the birth outcome prior to receiving the postnatal questionnaire and give details below.

GP name & address: _____

_____

_____

5. I agree to take part in the above study. ☐

_____ _____ _____

Name of participant: Date: Signature:

Address: _____

_____ Phone: _____

_____

Email: _____

_____ _____ _____

Name of Researcher/Consenter Date: Signature:

(Version 4) Patient copy/Researcher copy

3

Institute of Psychiatry
at The Maudsley

Department of Psychology
Institute of Psychiatry
De Crespigny Park
London, SE5 8AF

KING'S College LONDON
University of London

January 2011/Version 3

AN INVESTIGATION OF COGNITIVE BEHAVIOURAL TREATMENT (CBT) FOR OBSESSIVE COMPULSIVE DISORDER AFTER HAVING A CHILD

INFORMATION SHEET & CONSENT FORM

You are being invited to take part in a research study about psychological treatment of Obsessive Compulsive Disorder (OCD) for new parents. Before you decide whether to take part please take time to read the following information carefully. Please ask if there is anything that is not clear or if you would like more information.

1. What is the purpose of the study?
OCD can be a very debilitating disorder, affecting many areas of people's lives. For some people with OCD, it may prevent them deciding to have children, or may negatively affect their experience of parenting, although there is very little research in this area. This study is a randomised treatment trial examining whether a talking treatment called Cognitive Behaviour Therapy (CBT) for parents at this stage can help parents and their children.

2. Why have I been chosen?
We are asking expectant or new mothers and a small group of fathers whose main problem is OCD to participate. Participants can be told about or referred into the project by healthcare professionals such as their GP, members of their community mental health team or maternity care team, or can self-refer.

3. Do I have to take part?
Participation in the study is entirely voluntary and you can refuse to participate or withdraw at any time and without giving a reason. If you decide not to take part, this will not affect your present or future treatment in the National Health Service.

4. What do I have to do if I agree to take part?
If you agree to take part, you will be asked to complete an interview over the phone to establish whether you fit the criteria for the study. If you do, when your child is six months, you will first take part in a research assessment, which will take place at your home to maximise convenience to you. The visit involves completing questionnaires about OCD, parenting and other relevant issues, an interview, measurements of your baby and some short interactions of you playing with, feeding and changing your child that we would like to videotape.

You will then be randomly allocated to having immediate CBT on an intensive basis, or to a waiting list, meaning that you will receive treatment as usual (i.e. care from your local mental health team or GP) and will have intensive CBT with the research team after 6 months. CBT is a talking therapy targeting the thoughts, feelings and behaviours involved in OCD. Intensive treatment will involve 12

hours of therapy with a qualified therapist which takes place in a two-week initial burst, followed by 1-3 monthly follow up sessions as needed. This can be delivered at home to maximise convenience.

For parents in both groups, when your child is around 12 months we would like to make a second assessment visit similar to the first. If possible, we would also like you to attend the clinic for a short assessment at this stage. Those in the waiting list group will receive intensive CBT treatment after this point.

For participants in both groups we will communicate with your GP and mental health team (if you have one) about your taking part in the research, as they will remain responsible for your care. We will let them know the outcome of treatment.

We would like to pay £30 for each assessment visit to thank you for the time taken (approximately 3 hours).

We would like to send you a final questionnaire pack when your baby is 18 months old.

What are the possible benefits from the research?
CBT is the NICE guidelines recommended treatment for OCD and is well established as an effective treatment. We hope therefore that receiving it will be of direct benefit to you as a sufferer. The research aims to establish whether this intervention is effective for new parents, and also whether it is of benefit to their children and if there are any other factors that may improve the treatment for parents with OCD.

5. Will my taking part in this study be kept confidential?
We would like to ask your permission to communicate with your GP (and your local or perinatal mental health team if appropriate) to let them know you are taking part in the research and subsequently whether you found it of benefit. All letters will be copied to you unless you would prefer not to be copied in.

All information that you give as part of the research will be kept strictly confidential and will only be accessed by the researchers. All materials and data will be given an anonymous code that is used in data analysis. Nothing is reported that might identify individuals.

6. What will happen to the results of the research study?
The results will eventually be published in academic journals and presentations. Service user sites will also publish the main findings. No personal information will be identified in any publication of the results.

7. Who has reviewed the study?
This research has been reviewed and approved by the Lewisham Research Ethics Committee (Ethics approval no. 08/H0810/18).

8. Where can I get more information?

If you have any further questions please feel free to call or email one of us at any time using the details below.

Many thanks for your interest in this research.

Dr Fiona Challacombe
Chartered Clinical Psychologist
Tel: 020 7848 0762
fiona.challacombe@kcl.ac.uk

Prof Paul Salkovskis
Professor of Clinical Psychology,
University of Bath
p.m.salkovskis@bath.ac.uk

Address for further information:
Department of Psychology, POBox 77, Institute of Psychiatry, King's College London De Crespigny Park, London SE5 8AF.

Institute of Psychiatry

at The Maudsley

CONSENT FORM

Version 3: Jan 11

Study Title: CBT for OCD after having a child

Researchers: Fiona Challacombe & Paul Salkovskis

Participant number: 2M( )

Please initial box

1. I confirm that I have read and understand the information sheet dated Jan 11 (version 3) for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐

3. I understand that the information I provide will be collected fairly, will remain secure and confidential, and held no longer than necessary for the purposes of this research. ☐

4. I agree to communication with my GP and CMHT or perinatal services about my participation in the research and treatment outcome. ☐

4.a. I would like to be copied in to all such correspondence ☐

5. I agree to take part in the above study. ☐

6. I consent to video and audiotaping of me and my child for the purposes of the research. ☐

7. As parent and legal guardian I consent to my child's participation in the above study. ☐

_____ _____ _____

Name of participant: Date: Signature:

Contact details: _____

_____ Tel: _____

_____

_____ _____ _____

Name of Consenter Date: Signature:

(Version 3) Patient copy/Researcher copy

4

Appendix 2: Ethical approval letter

Lewisham Local Research Ethics Committee
South London REC Office (4)
University Hospital Lewisham
1st Floor Owen Centre
Lewisham High Street
London
SE13 6LH

Telephone: 020 8333 3135
Facsimile: 020 8314 0626
11 June 2008

Dr Fiona Challacombe
Department of Psychology
PO 77, Institute of Psychiatry
De Crespigny Park
London, SE5 8AF

Dear Dr Challacombe

Full title of study:	Obsessive Compulsive Disorder in the postnatal period: Predictors, course, treatment and the impact on parenting and infant outcomes.
REC reference number:	08/H0810/18

Thank you for your letter of 29th May 2008, responding to the Committee's request for further information on the above research and submitting revised documentation, subject to the conditions specified below.

The further information was considered at the meeting of the Sub-Committee of the REC held on 10 June 2008. A list of the members who were present at the meeting is attached.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Ethical review of research sites

The Committee has designated this study as exempt from site-specific assessment (SSA. There is no requirement for [other] Local Research Ethics Committees to be informed or for site-specific assessment to be carried out at each site.

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission at NHS sites ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements. Guidance on applying for NHS permission is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	*Version*	*Date*	
Application	5.5	08 March 2008	
Investigator CV			
Protocol	1	18 March 2008	
Covering Letter			
Covering Letter		29 May 2008	
Letter from Sponsor		08 November 2007	
Peer Review		19 February 2008	
Compensation Arrangements	Zurich	01 August 2007	
Questionnaire: OCI, RAS & Screening			
Questionnaire: OCI & RAS (Validated)			
Advertisement	1	18 March 2008	
Advertisement			
GP/Consultant Information Sheets	1	18 March 2008	
Participant Information Sheet: PIS - CBT	1	18 March 2008	

Participant Information Sheet: PIS - Period 11	1	18 March 2008	
Participant Information Sheet: PIS - Period 1	1	18 March 2008	
Participant Information Sheet: PIS & Consent - after having child	2	29 May 2008	
Participant Information Sheet: PIS & Consent period II	2	29 May 2008	
Participant Information Sheet: PIS & Consent Period 1	2	29 May 2008	
Participant Consent Form: Consent - CBT	1	18 March 2008	
Participant Consent Form: Consent - Period 11	1	18 March 2008	
Participant Consent Form: Consent - Period 1	1	18 March 2008	
Response to Request for Further Information			
Prof Paul Martin Salkovskis CV			
CV's for Andrea Percy & Manto Konstantoulaki			
Home Visiting Safety Protocol	1	29 May 2008	
Community Visits Safety Guidelines			

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document “After ethical review – guidance for researchers” gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

Notifying substantial amendments

Progress and safety reports

Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

08/H0810/18	Please quote this number on all correspondence

With the Committee's best wishes for the success of this project

Yours sincerely

Professor Chris Cairns

Chair

Email: pat.martin@uhl.nhs.uk

Enclosures: *List of names and professions of members who were present at the meeting and those who submitted written comments*

"After ethical review – guidance for researchers" *SL- AR2*

Copy to: *Mrs Gill Lambert – R&D Department for NHS Care Organisation at King's College London, IOP*

Prof Paul Salkovskis – Dept of Psychology, IOP

Lewisham Local Research Ethics Committee

Attendance at Sub-Committee of the REC meeting on 10 June 2008

Written comments received from:

Name	*Position*	
Professor Chris Cairns	Professor of Pharmacy Practice	
Mr Paul Martin	Lay Member	

Appendix 3: Publicity material for the study

ARE YOU PREGNANT OR DO YOU HAVE A YOUNG BABY (LESS THAN SIX MONTHS OLD)?




DO YOU SUFFER FROM

DISTRESSING UNWANTED THOUGHTS

(e.g. those of violence, contamination)

OR

COMPULSIVE BEHAVIOURS

(e.g. repeated checking / excessive washing)

A treatment trial for mums who suffer from Obsessive Compulsive Disorder (OCD) with young children (less than 6 months) is taking place, offering a talking therapy, cognitive behavioural therapy (CBT). It is run by the Institute of Psychiatry and the Centre for Anxiety Disorders, Maudsley Hospital, London. Treatments can be conducted at home.

For a **confidential and informal** discussion or for more details, please get in touch with Dr. Fiona Challacombe using the number or email below.

Fiona.challacombe@iop.kcl.ac.uk
Tel 0207 848 0762

Letter to referring colleagues

Dear Dr *******

AN INVESTIGATION INTO THE COURSE AND TREATMENT OF POSTNATAL OBSESSIVE COMPULSIVE DISORDER (OCD)

I am part of a research team from the Maudsley Centre for Anxiety Disorders currently running a psychological treatment study for mothers with OCD who have infants of less than six months (ethics approval reference 08/H0810/18). Although OCD can be hugely debilitating and can get worse during pregnancy and after the birth of a child, very little is known about the impact of OCD at this time on mothers and infants. We are looking for potential participants for this study which will offer treatment (Cognitive Behavioural Therapy; CBT) to all those enrolled in the project. As someone working with new parents we wished to let you know about this study in case you came across mothers with OCD who may be interested in taking part.

We will be delivering intensive CBT to all mothers that take part. CBT is the NICE guideline recommended therapy for OCD; intensive CBT involves 12 hours of treatment delivered in two weeks, followed by three monthly follow-up sessions. Some of these can take place at home to maximise convenience to participants. At the start of the study, participants will be randomly allocated either to (a) receiving CBT when their child is between 6 months old, or (b) waiting until their child is 12 months old (receiving treatment as usual in the meantime). The CBT on offer is therefore in addition to any other treatment the mothers would have received.

All participants will receive CBT, with half waiting for 6 months; we hope therefore that all participants will benefit directly from the study. The design will allow us to establish whether CBT is helpful for Mums at this time and whether it also benefits their infants. Please note that participants would not be discharged from your care by taking part, and we would liaise with you whilst they are part of the study.

All participants will take part in home-based assessments at two timepoints, when their infant is 6m and 12m old. They will receive £30 for each assessment due to the extra time involved.

Inclusion criteria are:

Mother, with at least one infant less than 6m old (please note that participants can be recruited in pregnancy)

Primary diagnosis of OCD

Adequate English language

Exclusion criteria are significant developmental problems in the infant or major mental illness (such as psychosis) in the mother.

All potential participants will undergo an initial diagnostic assessment and will be fully assessed for suitability prior to informed consent being obtained to enrol in the study.

Should any of the patients you refer chose to participate, I will write to inform you (including which condition they have been randomised to) and I will write again when the treatment has concluded.

If you have a patient who you think might be suitable, you can contact me directly or ask your patient to do so on 020 7848 0762 or by email (Fiona.challacombe@iop.kcl.ac.uk). Participants can also self-refer to the study and I enclose a poster that can be used to advertise the study in your setting if you think this would be appropriate.

Please do not hesitate to contact me if you have any questions or if you require more information about any aspect of the study.

With many thanks in anticipation of your help with the study, which we hope will be of benefit to parents with OCD and their children,

Yours sincerely,

Dr Fiona Challacombe

PRT Research Fellow & Clinical Psychologist

Institute of Psychiatry, Kings College London

Appendix 4: Mother-infant interactions coding manual including full Ainsworth Scales

Video coding for Postnatal OCD study

Interactions will be rated according to a series of scales of maternal, infant and dyadic behaviour.

It will first be necessary to determine exact timings for each episode to begin and end in order that time sampled behaviour may be accurate.

1. Maternal sensitivity scale

This is a global rating of the interaction. Principles and orientation to the scale are given in Ainsworth's full instructions. Maternal sensitivity has four essential components: (a) her awareness of the signals; (b) an accurate interpretation of them; (c) an appropriate response to them; and (d) a prompt response to them.

"In play and social interaction, the mother who responds appropriately to her child does not over-stimulate him by interacting in too intense, too vigorous, too prolonged, or too exciting a manner. She can perceive and accurately interpret the signs of over-excitement, undue tension, or incipient distress and shifts the tempo or intensity before things have gone too far. Similarly, she is unlikely to under-stimulate the child, because she picks up and responds to the signals he gives when he is bored or when he wants more interaction than has heretofore been forthcoming." (Ainsworth).

Sensitive mothers are therefore accessible to their infant cues, observe them and respond promptly and appropriately, hypothetically by empathising with the baby's point of view. The interactions are not dominated by the mother's own wishes and needs.

"When he needs soothing, she soothes him thoroughly, so he is quite recovered and cheerful. When he seeks social interaction she enters into a more or less prolonged exchange with him, after which, often enough, he is content to entertain himself. In contrast, the responses of some mothers with low sensitivity seem to be fragmented and incomplete. These mothers may try a series of interventions as though searching for the best method or solution. Highly sensitive mothers have completed, easily and well resolved interactions…A mother is inevitably insensitive when she fails to respond to the baby's out-stretched arms, to his excited greeting, or simply to his smile or gentle touch."

Given the rated interactions are much shorter than the original observations on which the scale was based, particular considerations are given below.

6m play: The sensitive mother is able to pace the interaction appropriately, give the infant time to respond to the toys presented. She will respond to B's cues of interest and engagement. Similarly where B is not engaged she will move on to another toy. The less sensitive mother will quickly move from toy to toy, not giving the infant time to explore the toy. This mother will also play with the toy in her own way rather than be directed by the infant's gaze and touch.

6m nappy change: An important consideration in rating is the functional nature of this task. The sensitive mother will engage with the baby despite some of her attention necessarily being on completing the task in hand. This may be speech, looks smiles and tactile behaviour. If B is upset she will acknowledge his distress and will attempt to soothe him, but she may not be able to complete this until the nappy change is over.

6m feed: The sensitive mother will be able to pace the feed appropriately, focusing on B's interest in the food and other stimulation in the room. She will be able to give the baby space to explore the food in appropriate ways (orally, tactile).

A less sensitive mother will be more focused on 'getting the job done' and what rather than how the infant eats.

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9. **Highly sensitive**	M is exquisitely attuned to B's signals. She "reads" B's signals and communications skillfully, and knows what the meaning is of even his subtle, minimal, and understated cue. She acknowledges his cue even if his demand is not acceptable. She has "well-rounded" interactions with B, so that the transaction is smoothly completed and both she and B feel satisfied.	'exquisitely sensitive' Practice tape: FU19 feed & play
8		

7. **Sensitive.**	This mother also interprets B's communications accurately, and responds to them promptly and appropriately but with less sensitivity than mothers with higher ratings. She may be less attuned to B's more subtle behaviors than the highly sensitive mother. Or, perhaps because she is less skillful in dividing her attention between B and competing demands, she may sometimes "miss her cues". B's clear and definite signals are, however, neither missed nor misinterpreted. This mother empathizes with B and sees things from his point of view; her perceptions of his behavior are not distorted. Perhaps because her perception is less sensitive than that of mothers with higher ratings, her responses are not as consistently prompt or as finely appropriate. But although there may be occasionally little "mismatches", M's interventions and interactions are never seriously out of tune with B's tempo, state and communications.	Frequently sensitive R1 – play responds to some not all cues. Pacing?
6.		R3 feed & nappy– generally sensitive but moments of self-focus
5. Inconsistently sensitive.	Although this mother can be quite sensitive on occasion, there are some periods in which she is insensitive to B's communications. Her awareness of B may be intermittent--often fairly keen, but sometimes impervious. Or her perception of B's behavior may be distorted in regard to one or two aspects although it is accurate in other important aspects. She my be prompt and appropriate in response to his communications at times and in most respects, but either inappropriate or slow at other times and in other respects. On the whole, however, she is <u>more frequently sensitive than insensitive.</u> What is striking is that a mother who can be as sensitive as she is on so many occasions can be so insensitive on other occasions.	Intermittent sensitivity R2 play
4.	50/50% sensitive/insensitive	R3 play R4 play – doesn't adapt speech (brittle); ignores many cues

3. Insensitive.	This mother frequently fails to respond to B's communications appropriately and/or promptly, although she may on some occasions show capacity for sensitivity in her responses to and interactions with B. Her insensitivity seems linked to inability to see things from B's point of view. She may be too frequently preoccupied with other things and therefore inaccessible to his signals and communications, or she may misperceive his signals and interpret them inaccurately because of her own wishes or defenses. She may delay an otherwise appropriate response to such an extent that it is no longer contingent upon his signal, and indeed perhaps is no longer appropriate to his state or mood. Or she may respond with seeming appropriateness to B's communications but break off the transactions before B is satisfied, so that their interactions seem fragmented and incomplete or her responses perfunctory, half-hearted, or impatient. Despite such clear evidence of insensitivity, however, this mother is not consistently or pervasively insensitive as mothers with even lower ratings. When the baby is truly distressed or otherwise very forceful and compelling in his communication, this mother can modify her own behavior and goals and, at this time, can show some sensitivity in her handling of the child.	Demonstrates capacity for sensitivity but frequently insensitive
2.	This mother may be delayed in her response to infant cues. However, she will also ignore some cues and show incongruous/inappropriate response to cues.	Tape 1: case 5 feed (baby cries; mother smiles)

1. **Highly insensitive.**	The extremely insensitive mother seems geared almost exclusively to her own wishes, moods, and activity. That is M's interventions and initiations of interaction are prompted or shaped largely by signals within herself; if they mesh with B's signals, this is often no more than coincidence. This is not to say that M never responds to B's signals; for sometimes she does if the signals are intense enough, prolonged enough, or often enough repeated. The delay in response is in itself insensitive Furthermore, since there is usually a disparity between one's own wishes and activity and B's signals, M who is geared largely to her own signals routinely ignores or distorts the meaning of s behavior. Thus, when M responds to B's signals, her response is inappropriate in kind or fragmented and incomplete.	Own needs seem paramount; Appears 'Switched off' from B Practice tape: TX01 feed

2. Cooperation-Interference Scale

Ainsworth's notes on this scale are very helpful and can be applied to ratings of shorter interactions. In essence, "the central issue of this scale is the extent to which the mother's interventions and initiations of interaction break into, interrupt or cut cross the baby's ongoing; activity rather than being geared in both timing and quality of the baby's state, mood and current interests. The degree of interference may be assessed in accordance with two considerations: (a) the extent of actual physical interference with the baby's activity, and (b) the sheer frequency of interruptions."

Two broad categories of interference are described – "Some mothers are highly interfering in an overwhelming physical sense. Such a mother snatches the baby up, moves him about, confines him, and, indeed, releases him with utter disregard for his activity-in-progress. When she restricts and restrains his movements it tends to be by direct physical intervention or force… Other mothers, whose interference does not so conspicuously emphasize physical force nevertheless must be considered highly interfering because they are "at" the baby most of the time--instructing, training, eliciting, directing, controlling. the highly interfering mother has no respect for her baby as a separate, active, and autonomous person, whose wishes and activities have a validity of their own….. the interfering mother feels that the baby is hers and that she has a perfect right to impose her will on him.

A type of interference (less forceful than direct physical intervention) may be seen in play and vocalization. An interfering mother tends to play entirely or almost entirely by doing something to the baby, or by getting him to do something she wishes. Such mothers instruct the baby in tricks or stereotyped games, persisting even when the baby is in an unresponsive mood. *[NB – this is relevant to rating the free play].* The interfering mother persistently tries to elicit specific vocalizations (or gestures) regardless of the baby's current interest in vocalizing or lack of it.

Mothers at the other end of this continuum seem to guide rather than to control the baby's activity…. A "co-determining" mother capitalizes on spontaneity. She responds to the baby's vocalizations, and does a minimum of trying to elicit specific sounds. She tends to pick up something the baby does as the beginning of a play sequence, and responds to his initiations of play. She may attempt to initiate play, but if the baby does not respond, she either desists, or shifts her approach. Most mothers undertake some kind of instruction, and on one occasion or another deliberately elicit something the baby has learned, so rating is a matter of balance between eliciting and instructing on one hand and spontaneity on the other--and also a matter of appropriateness of context and meshing with the baby's mood. *[NB – this is especially relevant to rating the free play]*

**Intervening in the baby's physical safety where this is warranted is not considered interference. Ainsworth notes that a less interfering mother is more likely to have baby-proofed the house.

"Restraint that involves physical confrontation will be considered interference. Impersonal restraints will not be considered interfering, except insofar as the manner and timing of imposing the restraint itself constitutes on interference. Thus strapping the baby in a highchair is not an interference, but if, when the baby has been refusing to sit, the mother jerks him down and straps him in, this would be considered an interference.

***One difficulty with this rating scale is how to rate mothers who have been highly interfering in the past 'and whose babies have become passive' as a result. Such babies may now not try to reach the bottle; it is no longer necessary to pinion their arms. Such babies when placed on the floor may not explore vigorously so it is not necessary to interfere. Even in instances where it is known that present generalized or situation-specific passivity is correlated with past restraints and interferences, the mother will be rated on the basis of positive evidence of interference (or conversely cooperation) which she now shows. [if little evidence of either, rate 5]. A 5 may therefore be taken as the starting point for a rating with positive evidence of either cooperation or interference taking the rating up or down from this point as indicated.

In between the two extremes come the milder interferences of verbal commands and prohibitions." Use of (unwarranted) physical restraint: <5

Feed: “Thus, for example, the mother who slaps or holds the baby's hands to prevent him from touching food would be considered interfering; the mother who scolds and warns without physical intervention would be considered interfering to a milder degree. The mother who gives no finger foods would not be considered interfering, unless she slaps, holds, scolds, or verbally prohibits.”

The feeding method, i.e. baby-led weaning is not in itself evidence of greater respect towards the autonomy of the child; this depends on the quality of the interaction – a respectful/ cooperative mother will continue to engage and respond to the child, will be interested in their behaviour and reactions. A less sensitive and cooperative mother will seem like she has ‘done her job’ by simply placing the food in front of the baby. However, unless she also displays intrusive behaviour, the score on this scale should remain at 5 or above.

Nappy change: “The mother who tussles or slaps an active child while changing him would be considered interfering. The mother who gives him something to manipulate or who holds his attention by talking to him playfully and thus does not need to interfere physically would be considered non-interfering.”

9. **Conspicuously cooperative.**	This mother views her baby as a separate, active, autonomous person, whose wishes and activities have validity of their own. Home is arranged in such a way as to minimize the need for interference and for direct control. Verbal commands and prohibitions across distance are an inevitable corollary of giving the baby freedom to explore and to learn, but the "conspicuously cooperative" mother manages to structure the freedom-to-explore situation so that she needs to command but rarely. Any mildly controlling interactions both constitute a small proportion of their total interaction and are themselves appropriate enough to the baby's mood and activity-in-progress to be considered co-determined.	
8		

7. **Cooperative.**	This mother does not have as conspicuous a respect for her baby's autonomy and ongoing activity as do mothers with higher ratings but on the whole she is cooperative and non-interfering. She shows less foresight than mothers with higher ratings do in arranging the physical environment and her own routine so as to avoid the need for interference. Consequently, there are more occasions in which she feels it necessary to interrupt or to exert control. Although she may give more verbal commands or prohibitions than mothers with higher ratings, she tries to avoid undue frequency of interference, and rarely, if ever, intervenes in direct, abrupt, physical ways. Nevertheless, she seeks the baby's cooperation in routines and in shifts of activity by mood-setting and other techniques mentioned above. She may, however, be somewhat less skillful than mothers in higher ratings in capitalizing on spontaneity and thus achieving optimum cooperation. Although the balance is in favor of spontaneity in play and in exchanges of vocalization, she may be somewhat more frequently instructive or "eliciting" than mothers with higher ratings.	R1 nappy
6		R3 nappy
5. **Mildly interfering.**	This mother is not so much an interfering or controlling person as she is inconsiderate of the baby's wishes and activities. Consequently she interrupts and interferes more frequently than do mothers with higher rating. On the whole her interference tends to be mild, however, rather than being direct, abrupt, and physically forceful. She tends to issue more verbal commands and prohibitions to control the baby cross a distance than do mothers with higher ratings. She tends to rely more on instructive eliciting modes of play and interaction and is less spontaneous than they are. Perhaps the most conspicuous difference from those with higher ratings, however, is in regard to routine-interventions and shifts of activity. She pays much less attention to mood-setting and to other techniques that aid smooth transitions from one activity to another. She tends to be <u>matter of fact</u>.	R1 play – moves baby around R2 feed – baby q passive but prevents touching bowl R3 play R4 play– moves baby

4.		R1 feed R2 play (baby passive + some more interference)
3. Interfering.	These mothers have an extreme lack of respect for the baby's autonomy. Like mothers with lower ratings, these interfering mothers display either direct, forceful, physical interference or frequent milder interferences or both. But usually the "3" mother has some kind of rationale for her actions which is perceivable to the observer (even though it may seem far from desirable); the interference is not obviously arbitrary. The mother may be focused on the desirability of undertaking a specific routine at this time; or she may be a "training" kind of mother who is determined to shape the baby to her way of doing things. In distinguishing the "3" mother from those with higher ratings, it is merely necessary to say that she is substantially more interfering either in frequency or in quality or both. She more frequently displays physical interference or restraint, or she much more frequently interferes mildly--instructing, eliciting, prohibiting, and commanding--or both. Perhaps even more important than the absolute amount of interfering is the proportion of mother-infant transactions that are interfering. The "3" mother is interfering in a greater proportion of her transactions than the "5" or "4" mother.	R3 – moves baby's face abruptly Holds baby's hands when feeding 6m Practice tape: FU11 feed
2.		

1. **Highly interfering.**	This mother has no respect for her baby as a separate, active, and autonomous person, whose wishes and activities have a validity of their own. There is an arbitrariness about the interference that is striking. Much (although not all) of it is "for no apparent reason". Some highly interfering mothers are conspicuous for the direct, physical, forcefulness of their interruptions or restraints. Others are conspicuous for the extreme frequency of interruption of the baby's activity-in-progress, so that they seem "at" the baby most of the time--instructing, training, eliciting, directing, controlling. But the "1" mother tends to combine both types of interference, even though she may emphasize one type more than the other.	

3. Warmth Scale

In order to make this rating, several indices should be considered such as maternal tone, facial expressions, posture, physical orientation to/engagement with the baby and the frequency, content and style of vocalisations. In addition the consistency of demonstrated warmth across the interaction should be considered. Any evidence of hostility should confer a low rating (<4); frustration (e.g. if baby wriggles in nappy change or refuses food in meal) interspersed with warmth may be a 5. Intermittent vocalising is likely to be a 5 or below as warmth is often conveyed by vocalising. NB note that some mums may seem brittle or manic in interactions which would confer a lower warmth score.

1	2	3	4	5	6	7	8	9
Hostile; No warmth		Flat; little warmth		Some warmth intermittent		Very warm		Exceptionally warm throughout
	Practice tape TX01	R2 play & feed (few vocalisations)			R1 feed R3 feed: warm despite baby not	R1 play		

					eating			

4. Baby-directed Maternal Vocalisations

These are time-sampled for every 15 seconds of interaction. Any vocalisation to the baby in the 15 seconds would confer a 1=present rating. The final rating is a proportion of vocalised sections relative to the whole number of rateable sections, i.e. %.

In addition, expressions of mild and strong control are tallied across the interaction.

TIME→	1	2	3	4	5	6	7	8	TOTAL
0-14									
15-29									
30-44									
45-59									
									N of n= %
Verbal control (count) **mildly controlling** (e.g. suggests, guides, prompts, gentle tone) or **strong controlling** behaviour (e.g. command, prohibit, forbid, caution or correct, stern tone)								Mild (n) Strong (n)	

5. Maternal Emotional Tone

This time sampled rating is made per minute. Maternal emotion tone is rated based on posture, facial expression, tone of vocalisations and any other behaviour that seems to indicate affective tone. If more than one emotional state is apparent in a time period, the relevant categories can all be counted.

Occasionally this is not rateable due to difficulties in filming. Cross through that minute if un-rateable.

	Description
Positively engaged	This includes smiles, laughs, active positive engagement with the child
Sad/flat	This includes unresponsive neutrality (and so differs from a neutral rating) e.g. preoccupied
Anxious/stressed	This is tangible stress or anxiety shown by mother.
neutral	This is passive engagement/watchfulness of child, e.g. if they are playing with a toy; also includes a look of concern the baby is becoming distressed.

Total each category at end and divide by rateable minutes to give %.

6. Over-conscientiousness

This is a global rating of the entire interaction. Over-conscientiousness (O/C) is considered to be any behaviour demonstrating extra caution. This may consist of vocalisations by the mother indicating excessive or unwarranted caution, or physical behaviour demonstrating this. Examples are given below.

Nappy change: use of excessive n wipes or excessive wiping; rushes through as quickly as possible.

Play: wiping a toy, continuous prevention of baby mouthing toy

Feed: avoidance of baby mess, excessive clearing up and wiping, mother wearing an apron; checking baby's food with every mouthful.

0	1	2	3
Absent	Mild	Moderate	Severe

No such behaviour	1-2 small behaviours which could be considered O/C	One clear example of o/c or several smaller behaviours throughout interaction	Several examples of the behaviour/ present for most of the time / 2+ very clear examples
	R1 – puts bib on for nappy change R2 – "you're not going to bang your head" (no obv reason to say)	R1 – comments on mess + restraint + apron	Use of two nappies/changing mats

INFANT RATINGS

1.Infant affect

This is a time sampled rating made for every minute of rateable video. As with maternal mood rating, more than one category may apply in a given minute.

	Description
Positively engaged	This includes smiles, laughs, active positive engagement with the mother. Baby shows alertness and interest in activity or mother.
Sad/flat	Baby seems withdrawn and unresponsive
fearful	Any display of fear or anxiety e.g. startle
Fussy	A short protest or cry
distressed	A more prolonged protest and cry
neutral	Baby is in watching state without showing particular interest in mother or activity; no obvious emotion displayed.

2. Infant liveliness (exploratory behaviour & initiation of interaction)

This is a global rating of infant liveliness/passivity. Liveliness is considered to be the extent to which the baby gives cues (e.g. at 6 months looks around, points, reaches, wiggles legs), explores the environment and the toys and the amount of interaction the baby initiates with the mother. The rating is made on quality and frequency of infant behaviour.

In addition, inconsistency is also noted, i.e. if the baby seems to veer from passivity to liveliness within a specific interaction.

1 Passive.		2 Lively (average).		3 Exceptionally lively;
Little attempt to explore/engage mother or environment		Wiggles and moves limbs, looks around and at M.		Explores (or attempts to) and vocalises throughout, visual, tactile, eye contact
R2 feed – stares at door	R2 play	R3 feed – looks at camera	R1 feed – wiggles, clasps foot	Tape 1: case 5

NB Also rate inconsistency.

DYADIC (Interaction) RATING

1. Synchrony/co-ordination Scale

This is a global rating to capture the extent to which mother and baby are 'in tune' with each other. This relates to sensitivity but also takes into account the behaviour of the baby and how much the baby's cues and attention is mother-directed as well as responses to that behaviour.

1	2	3	4	5
No or barely any reciprocity and joint attention. Like separate individuals If infant upset,		Some reciprocity but also some instances where they are acting more independently.		Lots of reciprocity and joint attention or play. Like a partnership. If infant upset, mother in tune with and adaptive to changes in affect.

mother may ignore or delay responding or not change her behaviour.				
	R2 feed – moments of reciprocity	R3 nappy		

Appendix 5: Ethnicity breakdown in both studies

Stated ethnicity	**Dichotomised ethnicity**
White UK	White
White European	
White Australian	
Mixed White/Iranian	
Tunisian	
Black African	Non white
Black Caribbean	
Indian Asian	
Albanian	
Mixed Philippine/Mauritian	
Chinese	

Appendix 6: Detailed treatment experiences of mothers with OCD

	Pre-pregnancy Treatment summary	Perinatal OCD presentation	Medication being taken at 6m PP	Therapy pregnancy to 6m PP	Comments
1	15 year history of OCD. No successful treatment experiences	Intrusive thoughts of accidental and deliberate harm. Depression. Exacerbation/onset of current episode immediately after birth	Citalopram 30mg	Crisis team involvement weekly then monthly visits Waiting list for CBT	
2	No history	Intrusive thoughts of harm. Acute anxiety presenting from pregnancy.	Amitryptaline, Sertraline, Clomipramine	Inpatient in MBU under observation. Contact with psychologist on ward; no CBT.	Risk assessed as high and social services involved.
3	Several courses of various therapy; some helpful	Contamination fears exacerbated by pregnancy and birth.	Declined	CBT for OCD during pregnancy – 'kept mum level' 4 sessions of CBT 'somewhat helpful'	
4	No prior treatment sought	Intrusive thoughts of accidental harm/illness	Declined	Supportive visits from health visitor Waiting list for CBT	
5	10 year history Past counseling and CBT unhelpful	Contamination fears exacerbated by pregnancy and birth.	Declined	None	

	Pre-pregnancy Treatment summary	Perinatal OCD presentation	Medication being taken at 6m PP	Therapy pregnancy to 6m PP	Comments
6	Beta blockers in past	Intrusive thoughts of harm presented acutely postnatally	Venlafaxine 300mg Olanzapine 2.5	Referred for 'psychological input' at 2 weeks PP but unclear what and when	
7	OCD 3y prior to pregnancy – prescribed medication only	Intrusive thoughts of harm exacerbated from pregnancy onwards.	Tried and did not like	Received 16-18 sessions of 'group therapy' covering anxiety and depression. Not helpful.	Previously told that intrusions meant mother at risk of psychotic depression which increased fear
8	Long history but no prior treatment sought	Ordering and arranging symptoms exacerbated from pregnancy onwards.	Sertraline 200mg Risperidone prescribed but did not take	None	
9	Approached services unsuccessfully in past & told did not have mental health problems	Contamination fears exacerbated from pregnancy onwards.	Fluoxetine 20mg from	In contact with perinatal mental health services. No formal intervention.	
10	Long history of OCD. Had not tried therapy.	Intrusive thoughts of harm exacerbated in postpartum	Seroxat 20mg longstanding	Self-referred to MIND counselor GP diagnosed PND & said no CBT in area	GP told mother that 'everyone had OCD' and she should get on with it
11	Long history of OCD. Behavioural therapy partly	Rumination and doubts exacerbated in postpartum.	Declined	None	

	Pre-pregnancy Treatment summary	Perinatal OCD presentation	Medication being taken at 6m PP	Therapy pregnancy to 6m PP	Comments
	successful.				
12	Onset 6 years before pregnancy	Intrusive thoughts of accidental harm	Citalopram 20mg	Counseling; not helpful	
13	Long history of OCD	Religious ruminations exacerbated from pregnancy	Discontinued after concern of effect on baby	Private CBT and hypnotherapy during pregnancy unhelpful 2 sessions of CBT with perinatal psychiatrist unhelpful	
14	No history	Intrusive thoughts of harm. Sudden onset postnatally	Citalopram 20mg	Waiting list for CBT	
15	Long history of tourettes and OCD. Psychodynamic therapy for other problems	Contamination exacerbated from pregnancy.	Declined	Waiting list for CBT	
16	CBT for panic helpful. History of OCD symptoms	Fear of accidentally harming the child exacerbated postnatally	Seroxat 40mg Beta blockers	Some contact with mental health nurse	
17	Never sought treatment	Contamination fears	Declined	None	
18	Longstanding OCD and other problems. Some past CBT helpful, some not	Intrusive thoughts of harm, exacerbated from pregnancy	Declined	12 Sessions of CBT via IAPT, 'somewhat' helpful.	Disclosed symptoms to HV who referred to SS without Mother's knowledge.
19	Subclinical CBT; never sought treatment	Contamination fears	Declined	Waiting list for CBT	
20	No history	Ordering and arranging with	Declined	GP diagnosed OCD	

	Pre-pregnancy Treatment summary	Perinatal OCD presentation	Medication being taken at 6m PP	Therapy pregnancy to 6m PP	Comments
		postnatal onset.		Waiting list for CBT	
21	History of OCD; no helpful treatment	Contamination fears	Sertraline 100mg	GP diagnosed PND	Mother did not feel GP understood OCD symptoms
22	Counselling unhelpful and previous CBT unhelpful	Contamination fears	Citalopram 30mg Quetiapine 75mg	Weekly visits from perinatal team 4/10 sessions of CBT 'helping'	
23	CBT partially helpful	Contamination fears	Declined	3 sessions of CBT unhelpful	Felt therapist did not understand
24	Fluoxetine helpful for panic	Intrusive thoughts of harm	Sertraline 50mg	GP suggested counseling and self-help	Mother did not disclose OCD to GP
25	Medication partially helpful	Intrusive thoughts of harm	Fluoxetine 20mg	None	HV commented 'everyone feels like this; get on with it'
26	Mediation unhelpful CBT partially helpful	Intrusive thoughts of harm	Quetiapine 300mg	OCD support group	Concern from specialist re risk
27	Medication helpful for depression	Thoughts of accidental harm/illness	Citalopram 40mg	6 sessions CBT – partially helpful	
28	Counseling and CBT partially helpful	Thoughts of accidental harm	Declined	Referred for counseling	
29	Counseling for claustrophobia unhelpful	Intrusive thoughts of harm exacerbated from postpartum	Declined	None	Mum did not disclose OCD to GP

	Pre-pregnancy Treatment summary	Perinatal OCD presentation	Medication being taken at 6m PP	Therapy pregnancy to 6m PP	Comments
30	CBT helpful	Intrusive thoughts of harm	Sertraline 200mg	Mindfulness group Waiting list for CBT	
31	No history	Intrusive thoughts of harm	Sertraline 100mg Diazepam 2mg	Mindfulness group 4/10 sessions counseling attended 'partially helpful'	GP told mother to chose hospitalization or to be strong and fight off the thoughts. HV told mother thoughts were result of not being busy enough.
32	Medication helpful	Contamination	Amytryptaline 60mg	None	Mother told her GP she was too anxious for CBT
33	Longstanding OCD. CBT unhelpful	Checking	Sertraline 100mg	None	
34	Counseling for anxiety helpful	Intrusive thoughts of harm	Declined	None	Diagnosed with PND

PP=postpartum; PND = postnatal depression; GP = General Practitioner; HV=health visitor

	Intensive CBT group			Treatment as Usual group (TAU) 12m data missing for one person)	
	0-6m postnatal	**6-12m postnatal**		**0-6m postnatal**	**6-12m postnatal**
2	Amytriptaline Sertraline Clomipramine MBU psychology	Venlafaxine	**1**	Citalopram Crisis team visits –partly helpful Referred for CBT	6 sessions of mindfulness 'partly helpful' Citalopram Metazapine
6	Venlafaxine Olanzapine Referred for 'psychological input'	Venlafaxine	**3**	4 sessions CBT – 'partly helpful'	No treatment
7	General CBT group -'not helpful'	General CBT group – 'not helpful Mindfulness group 'made worse'	**4**	Referred for CBT	12 sessions CBT - 'helpful'
8	Sertraline	Sertraline Quetiapine Referred for more CBT	**5**	No treatment	Fluoxetine
11	No treatment	Supportive meetings with clinical psychologist 'not CBT'; partly helpful'	**9**	Fluoxetine	Fluoxetine
13	No treatment	Seroxat	**10**	Seroxat Private counselor at MIND – 'partly helpful'	3 sessions counseling 'partly helpful' Paroxetine
14	Citalopram Referred for CBT	No treatment	**12**	Citalopram 8 sessions counseling 'not helpful'	Citalopram
17	Citalopram	No treatment	**15**	Assessment from perinatal team – 'not helpful'	No treatment

18	12 session CBT 'somewhat helpful'	Citalopram	**16**	Seroxat BetaBlockers	Seroxat
20	No treatment	No treatment	**19**	Referred for CBT	20 sessions CBT 'partly helpful'
22	Citalopram Quetiapine 4 sessions CBT 'helping'	Citalopram Quetiapine 2 sessions CBT for OCD begun before 6m 'not helpful'	**21**	Sertraline	3/12 sessions of CBT 'partly helpful' Sertraline
25	Fluoxetine	No treatment	**23**	3 sessions CBT unhelpful	17 sessions CBT 'not helpful'
28	Referred for counselling	Perinatal team visits (pregnant at 12m) – partly helpful	**24**	Sertraline	MISSING
29	Referred for counselling	No treatment	**26**	Quetiapine Anfamil OCD support group – 'partly helpful'	4/20 sessions CBT 'partly helpful'
32	Amitryptaline	Fluoxetine	**27**	Citalopram 6 sessions CBT 'partly helpful'	Citalopram
33	Sertraline	Sertraline	**30**	Sertraline Referred for CBT Mindfulness group – partly helpful	4/6 sessions CBT 'helpful' Sertraline
34	No treatment	Attended 1 session counseling – dropped out due to fears they would not understand.	**31**	counseling 'unhelpful' Sertraline Diazepam	Counseling 'not helpful' Quetiapine Sertraline Diazepam

TOTALS	Medication = 9 Individual CBT=1 Other psychological /support from mental health prof= 2 No treatment = 5	Medication = 8 CBT=1 Other psychological /support from mental health prof = 4 No treatment = 5		Medication = 11 Individual CBT=3 Other psychological /support from mental health prof= 7 No treatment = 1	Medication = 10 Individual CBT=6 Other psychological /support from mental health prof= 3 No treatment = 2

Appendix 7: Papers arising from the current study

Challacombe, F. L. and P. M. Salkovskis (2011). "Intensive cognitive-behavioural treatment for women with postnatal obsessive-compulsive disorder: A consecutive case series." Behaviour Research and Therapy **49**(6-7): 422-426.

Challacombe, F. L. and A. L. Wroe (2013). "A hidden problem: consequences of the misdiagnosis of perinatal obsessive-compulsive disorder." British Journal of General Practice **63**(610): 275-276.